IDG .com

WHAT WOULD YOU DO?

Two CIOs. Six hypothetical management challenges. How would you handle these tricky situations? Page 56

LOVELY LI'L LAPTOPS

Cool new laptops are smaller, but they're crammed with memory and features. Page 76

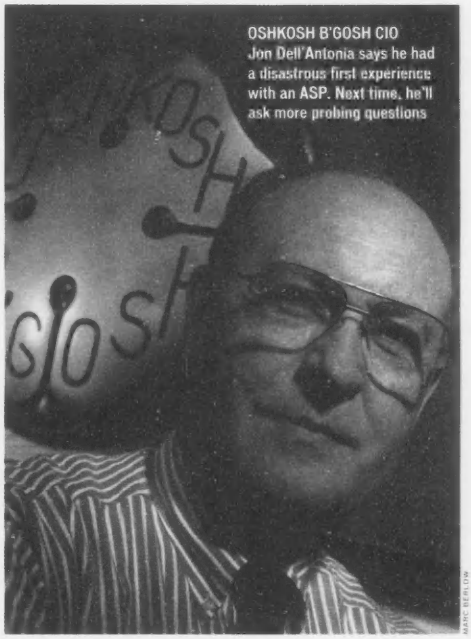
HACTIVISTS

IT professionals by day, Goth cyber-freedom fighters by night. Page 52

COMPUTERWORLD

THE NEWSPAPER FOR IT LEADERS • WWW.COMPUTERWORLD.COM

OCTOBER 16, 2000 • VOL. 34 • NO. 42 • $5 COPY



OSHKOSH B'GOSH CIO Jon Dell'Antonia says he had a disastrous first experience with an ASP. Next time, he'll ask more probing questions

MARC BERLOW

AVOIDING ASP ANGST

BEWARE: The business models for application service providers are changing weekly, and half of ASPs are going to fail. Gary H. Anthes talks with early customers to identify the hard questions that CIOs should ask to avoid an ASP nightmare. One hint: Focus less on the *A* in ASP and more on the *S*, including how service levels will be measured.

Story begins on page 80.

NEWSPAPER

$BXBBJFT$ ******CAR-RT SORT**B-052
$4810GUIZ984PB005$ OCT 01 003 9524
U M I 143
U M I
PO BOX 984
ANN ARBOR MI 48106-0984

CABLE CREEPS INTO THE CORPORATION

Users of cable for broadband connectivity cite big savings over telco offerings

BY BOB BREWIN
HONOLULU

The cable guy may soon be coming to your office.

When First Hawaiian Bank decided to roll out high-speed Internet access to its 56 branches throughout the four major Hawaiian islands this spring, it made a carrier choice that might seem strange to anyone frustrated with poor service from his cable TV company. The bank chose Oceanic Cable, the local cable affiliate of New York-based Time Warner Inc.

HIGH-SPEED ACCESS

According to Mark Taylor, vice president of retail information and planning at First Hawaiian, a division of BancWest Corp. in Honolulu, the easiest and most economical way for the bank to obtain broadband Internet access was to subscribe, through Oceanic, to a corporate high-speed cable LAN service called Road Runner.

The message is clear: Cable is going corporate.

Ernest Takahashi, information systems director at Honolulu-based Wilson, Okamoto & Associates Inc., a civil and structural engineering firm, said he decided to use Oceanic's cable LAN service because it provided the wide bandwidth the company needs to "send large CAD drawing files that are megabytes in size . . . not just on the island, but to the mainland as well."

Corporate Cable, page 105

CHEMICAL SECTOR LEADS E-BUSINESS

New Economy a good fit for would-be dinosaurs

BY JULIA KING
PHILADELPHIA

Pipelines, production plants, petrochemicals. Eastman Chemical Co. boasts all the brick-and-mortar assets of an Old Economy dinosaur. Yet its Web site, Eastman.com, racks up an average of 3 million hits per month, representing $200 million in orders last year.

Along with several other would-be rust buckets in the digital economy, Eastman is turning out to be surprisingly swift in transforming into an electronic business.

FRED BUEHLER: New Economy, new revenue

Analysts rank the $435 billion U.S. chemical sector as one of the most successful online industries, right up there with high-tech electronics and financial services.

"One reason the chemical industry is somewhat in the lead is that it's a highly inter-

Chemicals, page 16

IT CHANGES HIT SUPPLY CHAINS

Kmart, Caterpillar tap i2 to handle IT overhauls

BY MARC L. SONGINI
SAN DIEGO

Citing a supply chain with no coordination, accountability or effective means of tracking inventory, Kmart Corp. CEO Chuck Conaway last week outlined the company's plans for overhauling its information technology systems to handle the stresses of conducting Web-enabled business.

"We're not where we need to be," he said of Kmart's online

Supply Chain, page 16

CIOs: RECRUIT TRAINABLE ROOKIES

Perks, training count in a tight labor market

BY PATRICK THIBODEAU
WASHINGTON

In a tight and competitive information technology labor market, companies looking to attract and retain employees have to hire raw talent, invest heavily in training and offer employment perks such as flexible hours, telecommuting and job sharing, a group of CIOs said last week.

"You actually don't need people with a lot of experience — the technologies are changing so fast [anyway]," said Andre Mendes, CIO at PBS in Alexandria, Va. "What you need are people with potential, with love for their technology and the ability to learn quickly." At PBS, Mendes added, meeting IT employment needs

Recruiting, page 105

intel inside
pentium III
THE PERFECT SERVER FOR A COMPANY WITH NO ROOM FOR ANOTHER SERVER.
DELL
PowerEdge 2450

Finally, a server that not only fits your company's needs, but also fits in your company. The Dell™ PowerEdge™ 2450, with its ultrathin 2U form factor, allows up to 21 servers and 42 processors in a 42U Dell rack. But don't let its size fool you. Like Dell's complete line of servers, it packs a lot of power. With dual Intel® Pentium® III processor capability at up to 1GHz and 133MHz Front Side Bus, the PowerEdge 2450 will give your company all the computing power (and elbowroom) it needs.

DELL™ SERVERS:

DELL™ POWEREDGE™ 1400

NEW—Affordable Entry Level Server

- Intel® Pentium® III Processor at 800MHz (up to 1GHz)
- Dual Processor/RAID Capable
- 128MB 133MHz ECC SDRAM (up to 2GB)
- 9GB® 7200 RPM Ultra3 (Ultra 160) SCSI HD (up to 36GB® 10K RPM)
- 144GB Internal Storage Capacity
- Integrated NIC/SCSI Controllers; 48X Max CD-ROM
- Dell™ OpenManage™ Server Management Solutions
- 3-Yr NBD On-site Service†; 7x24 Phone Support

$1599 E-VALUE CODE 31356-291015

BUSINESS LEASE: $44/MO.*, 48 MOS.**

- 2nd 9GB® 7200 RPM Ultra3 SCSI HD, add $239
- Small Business Upgrade Bundle, add $1877

DELL™ POWEREDGE™ 2450

Ultra-Slim (2U) Rack-Optimized Server

- Intel® Pentium® III Processor at 733MHz (up to 1GHz)
- Dual Processor Capable
- 128MB 133MHz ECC SDRAM (up to 2GB)
- 9GB® 10K RPM Ultra3 SCSI HD (up to 36GB®)
- Up to 180GB Hot-swappable Internal Storage Capacity
- Integrated NIC/SCSI Controllers; 24X Max CD-ROM
- Dell™ OpenManage™ Server Management Solutions
- 3-Yr NBD On-site Service†; 7x24 Phone Support

$2939 E-VALUE CODE 31356-291029

BUSINESS LEASE: $81/MO.*, 48 MOS.**

- 2nd 9GB® 10K RPM Ultra3 SCSI HD, add $349
- MS® Windows® 2000 Server, add $799

DELL™ POWEREDGE™ 2450

Ultra-Slim (2U) Rack-Optimized Server

- Intel® Pentium® III Processor at 733MHz (up to 1GHz)
- Dual Processor Capable
- 128MB 133MHz ECC SDRAM (up to 2GB)
- 9GB® 10K RPM Ultra3 SCSI HD (up to 36GB®)
- Up to 180GB Hot-swappable Internal Storage Capacity
- Embedded Single-channel RAID with 64MB Cache
- Redundant Hot-swappable Power Supplies
- Integrated NIC/SCSI Controllers; 24X Max CD-ROM
- 3-Yr NBD On-site Service†; 7x24 Phone Support

$3469 E-VALUE CODE 31356-291034

BUSINESS LEASE: $96/MO.*, 48 MOS.**

- Red Hat® Linux™ 6.2, add $149 NOW $0

DELL™ POWEREDGE™ 4400

Departmental Server

- Intel® Pentium® III Xeon™ Processor at 866MHz (up to 1GHz)
- Dual Processor/RAID Capable
- 128MB 133MHz ECC SDRAM (up to 4GB)
- 9GB® 7200 RPM Ultra3 SCSI HD (up to 73GB® 10K RPM)
- Up to 510GB Hot-swappable Internal Storage Capacity
- Integrated NIC/SCSI Controllers; 40X Max CD-ROM
- Dell™ OpenManage™ Server Management Solutions
- 1-Yr DirectLine® Network Operating System Support
- 3-Yr NBD On-site Service†; 7x24 Phone Support

$4489 E-VALUE CODE 31356-291044

BUSINESS LEASE: $124/MO.*, 48 MOS.**

- 2nd 9GB® 7200 RPM Ultra3 SCSI HD, add $279

DELL.COM

USE THE E-VALUE CODE TO GET EXACTLY WHAT YOU WANT | **800.241.5853** | WWW.DELL.COM

USE THE POWER OF THE E-VALUE CODE. Match our latest technology with our latest prices. Enter the E-VALUE code online or give it to your sales rep over the phone. www.dell.com/evalue

VALUE

Call M-F 7a-9p | Sat 10a-6p | Sun 12p-5p CT. Canada 800-839-3355. Mexico 001 877 269-3355. GSA Contract #GS-35F-4076D.

Prices, specifications, and availability may change without notice. Taxes and shipping charges extra, and vary. Cannot be combined with other offers or discounts. U.S. only. For a copy of our Guarantees or Limited Warranties, write Dell USA L.P., Attn: Warranties, One Dell Way, Round Rock, Texas 78682. Service may be provided by third party. Technician will be dispatched, if necessary, following phone-based troubleshooting. Availability varies. *For hard drives, GB means 1 billion bytes; accessible capacity varies with operating environment. †Business-leasing program by Dell Financial Services L.P., an indirect wholly owned subsidiary of Dell Computer Corporation, to business customers. Lease payments based on a 48 month FMV purchase option lease and do not include taxes, fees and shipping charges. Subject to credit approval and availability. Lease terms and pricing subject to change without notice. **Int. Rel. rate made high and Pentium are registered trademarks and Intel SpeedStep, Pentium III Xeon, and Celeron are trademarks of Intel Corporation. MS, Microsoft, Bas400nite, Windows NT, and Windows are registered trademarks of Microsoft Corporation. ©2000 Dell Computer Corporation. All rights reserved.

BACKUP EXPRESS

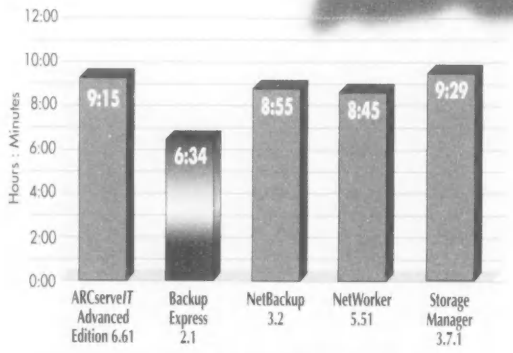
Chosen the Best Enterprise Backup Solution

Independent Test Results

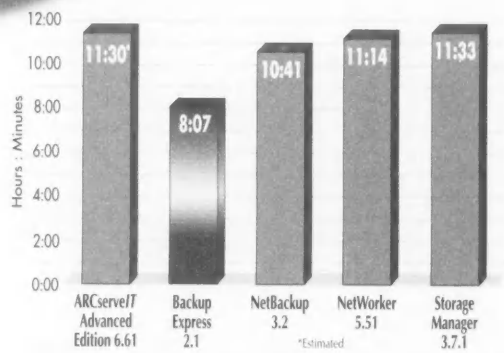
"Taking into consideration all the test factors, including scalability and support, I give the overall edge to Backup Express for its excellent performance and midrange pricing."

"Backup Express' backups and restores were faster than those of the other products."

Tom Iwanski, senior product reviewer, *Windows 2000 Magazine* Lab Report (June 2000)



Fastest Backup

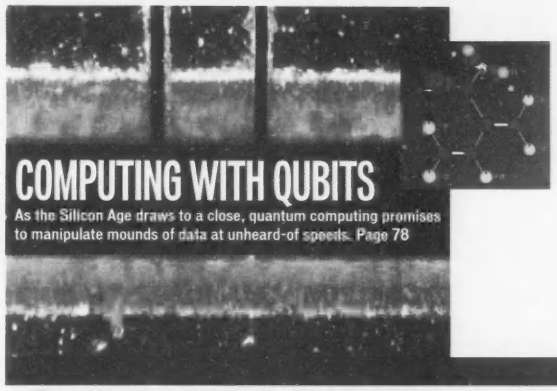


Fastest Restore

For a FREE copy of the Lab Report or to learn more about Syncsort's Backup Express, visit www.syncsort.com/A0cwb or call (201) 930-8200.

syncsort

50 Tice Boulevard · Woodcliff Lake, NJ 07677
(201) 930-8200
www.syncsort.com



COMPUTING WITH QUBITS

As the Silicon Age draws to a close, quantum computing promises to manipulate mounds of data at unheard-of speeds. Page 78

FLORIDA'S IT HEAT

A booming Internet economy and a proximity to the growing markets of South America are causing IT opportunities to explode in South Florida, but life there's not as slow and easy as you'd think. Page 90

COMPUTERWORLD THIS WEEK

OCTOBER 16, 2000

NEWS 6

6 **UNISYS PLANS** to cut staff following an earnings plummet but promises to focus on Win 2k Datacenter machines, of which it is the sole provider.

7 **TOYOTA AIMS** to webify its cars and supply chain using wireless networks and tight e-commerce ties to dealers.

8 **FCC BLASTS** "spectrum squatters" that impede development of wireless Web applications.

10 **ONLINE RETAIL** sales may double this year, as e-retailers scramble to prepare for the onslaught.

12 **MICROSOFT'S EXCHANGE** 2000 poses integration problems, but users say it may be worth it.

14 **IBM UNVEILS** its version of a high-end, more scalable Unix server following similar debuts by Sun and HP.

20 **OIL COMPANIES TEAM** up in venture to develop vendor-neutral collaboration technology.

24 **UN VOLUNTEERS BUILD** IT in the Third World, helping the poor with medical care and education, and wiring local artisans for e-commerce.

MORE

Editorial/Letters 32, 33, 41
How to Contact CW 104
Shark Tank 106
Company Index 104

BUSINESS 43

44 **TILE MAKER HOPES** Web will revive business; analysts doubt it will happen.

46 **MILITARY BLAZES** a path for government outsourcing deals with huge EDS contract.

48 **GERMAN FIRMS** race to beat out foreign companies before they move in on Germany's growing pool of Net users.

WORKSTYLES

50 **SEND.COM PUTS** its IT staff to the test as it scrambles to relaunch its site in time for the holidays.

52 **HACKERS FIGHT** injustice by night in the underground world of cyberactivists.

55 **BUZZWORDS SWAMP** the IT scene. But which are here to stay?

56 **CIOs DISAGREE** on how to handle management crises.

QUICKSTUDY

62 **CAPITAL ASSETS** play a key role in how you allocate your IT budget.

TECHNOLOGY 69

70 **BMW TESTS** an in-plant video system powered by broadband DSL Internet connections.

72 **CABLE & WIRELESS** will migrate telephone customers to voice over IP during the next three years.

HANDS ON

76 **LAPTOPS GROW** on the inside, while they shrink on the outside, says reviews editor Russell Kay.

80 **ASP PUZZLE:** What to ask to find the right one.

82 **NEW TOOLS** catalog data for access to all of it, all the time.

QUICKSTUDY

86 **IP MULTICASTING** delivers a single packet, sent only once by the source host to multiple destinations. What's in it for you?

EMERGING MARKETS

90 **IT WORKER DEMAND** hits all-time high on Florida's southern shores.

ONLINE

Money isn't everything. In her **Workforce Watch** column, Gartner Group's **Barbara Gomolski** writes about nonfinancial incentives that can make your employees happy. *www.computerworld.com/workforce*

It's going to be a while before wireless e-commerce becomes a viable way to make money, news editor **Anne McCrory** reports from the recent mobile-commerce conference in Phoenix. Check it out in the **E-Commerce Community.** *www.computerworld.com/ecommerce*

Also in the **E-Commerce Community**, reader **Deb Goldstein** chides Web sites for not paying closer attention to pricing errors. *www.computerworld.com/ecommerce*

OPINIONS

32 **MARK HALL** writes that the next generation of IT leaders may need to know more about outsourcing management than about technical details.

32 **DON TENNANT** says it took 3Com a while, but it made the right choice in elevating Bruce Claflin to the CEO post.

33 **ALAN PALLER** says Visa has given the Internet community an effective starting point that could lead to better security.

36 **WILLIAM M. ULRICH** says the CIO has a new role for a new era, and he offers three steps to transform the IT organization.

50 **ED YOURDON** writes that you shouldn't measure a project's success by only its short-term benefits.

64 **JOE AUER** says good note-taking is crucial when you're negotiating with an IT vendor.

106 **FRANK HAYES** says you should regularly check the different ways Web surfers might guess at your company's domain name, or it could cost you customers.

AT DEADLINE

Dell Recalls Batteries

Dell Computer Corp. in Round Rock, Texas, last week announced a voluntary recall of 27,000 batteries that it said could short-circuit, heat up and potentially catch on fire. The short-circuiting problems can occur even when the batteries aren't in use, said Dell. The company said it has received one report of a fire caused by the defect. The batteries were made by Sanyo Electric Co. in Japan and are used in Latitude and Inspiron notebook PCs, introduced by Dell in June, the company said.

Visa Launches Site For Merchants

Visa International Inc. in Foster City, Calif., last week launched a new Global Data Security Web site for merchants and announced new operating policies for protecting confidential consumer information on merchant sites. The Web site *(www.visa.com/secured)* gives international merchants information about how to meet expanded data-protection standards related to the way Visa account information is stored. The site provides self-assessment tools as well as downloadable guides to Visa's new data-security standards and best practices.

Private Sector Gets Federal Spectrum

The Federal Communications Commission last week transferred 50 MHz of spectrum previously used by government agencies to the private sector. The FCC said the new slice of airwaves allocated for commercial use will support a wide range of services, including voice phone calls as well as "new broadband, high-speed data and video services."

Short Takes

New York-based online designer-clothing retailer BLUEFLY INC. has received a commitment for an investment infusion of up to $15 million from SOROS PRIVATE EQUITY PARTNERS LLC. . . . More than 300 universities across North America are receiving donated Linux software and services through a program being launched by TURBOLINUX INC. in Brisbane, Calif.

Unisys Plans Job Cuts After Weak Quarter

But says Win 2000 Datacenter unaffected

BY MICHAEL MEEHAN

Unisys Corp. last week said it plans to cut its workforce by more than 1,000 and de-emphasize some low-margin businesses and products in the wake of a big drop-off in its earnings for the third quarter.

But Unisys assured customers that the cuts wouldn't affect its machines that run Windows 2000 Datacenter, Microsoft Corp.'s newly released operating system that seeks to challenge Unix in corporate computer rooms. Unisys is the sole hardware vendor supporting Datacenter so far.

During a conference call, Unisys Chairman and CEO Lawrence Weinbach stressed the importance of the company's high-end ES7000 server line, which can pool as many as 32 Intel processors.

"We believe there's a big market for that product, and it's one we intend to pursue," Weinbach said.

Informed of the Unisys news, a Microsoft spokesperson said the company was committed to its partnership. "Unisys has already shown tremendous leadership and dedication to the program as the manufacturer of the ES7000, now being licensed by Compaq, HP and ICL," the spokesperson said.

Risky Strategy?

However, in a recent report on Unisys' sluggish earnings, Giga Information Group Inc. analyst David Friedlander blamed the firm's financial decline on Microsoft's slow delivery of Windows 2000.

"Most of its eggs are in one basket: Unisys has put almost all of its engineering efforts behind Windows NT and Windows 2000," Friedlander wrote. "While its accomplishments in the Windows area have been successful, this is a potentially dangerous strategy if Windows 2000 Server does not gain market acceptance quickly."

The Blue Bell, Pa.-based computer maker and professional services firm reported a third-quarter profit of $42.9 million, down 69% from earnings of $138.4 million in the same period last year. Revenue declined 9% to $1.7 billion, compared with revenue of $1.9 billion for the period last year.

Unisys said the results were in line with its financial outlook for the quarter. But the struggling company still detailed a series of planned changes following what Weinbach described in his announcement as "an exhaustive review of our services and technology businesses."

Weinbach said Unisys trimmed 300 jobs during the past three months through a hiring freeze, which will remain in effect for the rest of this year. The company is also offering early retirement to about 1,500 U.S. employees. Unisys had 35,800 employees worldwide last year.

According to the company, it plans to focus its resources through moves such as cutting its portfolio of industry-specific technology offerings from 30 to 15 and reducing its investment in unspecified "low-margin commodity products." In addition, the firm said its outsourcing unit will more aggressively pursue joint ventures and other new ways of doing business, in an effort to increase revenue growth.

More restructuring steps are likely within the next six to eight weeks Weinbach said. ▸

MORE THIS ISSUE
For more earnings reports, **see pages 14 and 28.**

FleetBoston Begins Offering Virtual Safe-Deposit Boxes

Seeks new revenue storing e-documents

BY MARIA TROMBLY

In the latest attempt at generating an online banking revenue stream, FleetBoston Financial Corp. is introducing a new service for what may end up being a pretty narrow market: virtual safe-deposit boxes.

Some smaller companies already provide similar services but haven't gotten a lot of takers, said Paul Jamieson, an analyst at Gomez Advisors Inc. in Lincoln, Mass. Other virtual lockbox services include SafeDepositBox.com in Atlanta, used by Alpharetta, Ga.-based NetBank Inc. and Fort Lauderdale, Fla.-based BankAtlantic Bancorp. Zions Bancorp in Salt Lake City also offers a virtual safe deposit box. Jamieson said he doesn't expect much demand for digital lockboxes, at least initially.

The potential cost of the virtual lockboxes is $120 per year, and that's a high price to pay for electronic storage these days, said Richard Bell, an analyst at Needham, Mass.-based TowerGroup.

Nevertheless, Jamieson said he does expect Fleet's banking competitors to jump into the fray, if only to be able to boast to their customers that they offer comparable services.

Last week, Fleet announced plans to launch a system that will let customers to store important electronic documents in password-protected accounts. The FileTrust service is scheduled to be launched at the end of next month in a pilot project aimed at small businesses. It's expected to be followed by an extended service for individual customers early next year. Large firms will eventually be able to use customized versions of the technology.

The rollout of FileTrust is related to the new federal law that went into effect Oct. 1 that gives weight to digital signatures and the storage of business documents in electronic form. FleetBoston officials said they expect companies to soon have large collections of legal, tax-related and other documents that need to be kept online in a secure location.

Users will be able to rent space on the FileTrust system and upload or download files via the Web using a personal identification number and a password to gain access to documents, at a cost of up to $10 a month. Pricing will be based on the features customers use and their existing business relationships with the bank, said Blaise Heltai, managing director of global Internet strategy at FleetBoston.

Companies will also be able to set up guest access privileges to let other users like lawyers or accountants view specific files that are stored in their allotted areas of the system.

That could create potential security problems, according to Bell. "It's only as secure as the password," he said, adding that banks require traditional lockbox users to do more than just have a key — they may need to show photo identification, for example.

But according to Robert Erman, general manager of the Boston office of New York-based Plural Inc., which developed the product for Fleet, more security features — such as smart cards — will be added to the system in the future, though he declined to offer time frames for those features.

"One of the trade-offs is having mass availability," Erman said. Customers who use the electronic lockbox to store sensitive documents for use while they travel might not have smart-card readers or retina scanners everywhere they go, he explained.

Fleet also plans to offer services like digital signatures and electronic notarization. ▸

What Good Is a Virtual Lockbox?

FleetBoston suggests the following uses:

- Sharing sensitive legal files with your lawyer
- Sharing financial and tax-related files with your accountant
- Accessing important files while on the road
- Storing digital documents such as contracts

Toyota Web-Enables Dealers, Supply Chain

Following rivals, carmaker projects huge savings in transportation, inventory

BY MARC L. SONGINI AND LEE COPELAND
SAN DIEGO

TOYOTA MOTOR Sales USA is pushing the pedal to the metal to get its products and operations as Internet-enabled as possible.

The automaker's efforts to streamline its transactions with dealers and its supply chain aren't much different from earlier initiatives driven by rivals such as General Motors Corp. and Ford Motor Co., according to analysts. But Toyota is one of the first automakers to use the Web aggressively to connect with its dealerships, said Karen Peterson, an analyst at Gartner Group Inc. in Stamford, Conn.

Toyota is also the first company to pursue an online replacement-parts aftermarket exchange.

Last week at the Planet 2000 trade show here, sponsored by i2 Technologies Inc., Toyota CEO Yoshi Inaba outlined his company's wide-ranging Web initiatives. They stretch from providing automobiles with wireless access to live traffic and safety reports to connecting Toyota dealers in a virtually paperless communications network across the country.

With the rapid growth in the number of cars sold and models available internationally, success will depend on which carmakers use the Internet to capture and use information most effectively — particularly in areas such as supply-chain and customer relationship management, said Inaba.

For its part, Inaba said, Toyota is working closely with Dallas-based i2 to launch what the automaker is calling the Monarch Project, which is aimed at improving operations in Toyota's $1 billion parts-replenishment business.

Inaba and other Toyota officials declined to disclose how much the company is investing in the project. But one of its goals is to use Internet connections to speed up communications between dealers and parts suppliers and distributors. I2 software will enable Toyota to order parts based on the time of year or region.

The project, slated to go live by 2002, should enable Toyota to cut its transportation costs by 25% and reduce the "current day's supply of total inventory" by 50%, Inaba said.

A major part of the initiative will be Dealer Daily, a Web-based portal that will connect Toyota's 1,300 dealers with its factories around the clock, improving parts ordering, sales and vehicle repair operations.

For example, dealers will be able to download sales and other company information directly from the Web using a virtual private network and leased lines, said Barbra Cooper, CIO at Toyota Motor Sales USA, in an interview last week. This will prevent Toyota from having to send two pounds of paper-based updates to dealers each week, slashing about $3 million in annual printing and distribution costs.

CIO BARBRA COOPER: Supply-chain data will be more available

In the long term, Toyota wants to have complete visibility in its supply chain, said Cooper. Suppliers will be able to look at Toyota's parts inventories and automatically replenish them, instead of waiting for Toyota to make a request.

The new i2 system will also allow dealers to instantly locate the exact car model a customer has ordered — whether it's in a warehouse, on a truck or in a factory — and deliver it as soon as possible. This is a challenge other carmakers are currently wrestling with, said analysts.

Though it's not quite the build-to-order model Dell Computer Corp. uses to sell its PCs, Toyota's approach should greatly reduce the cycle time for customers to get their cars, Cooper said. "There are lots of improvements that can happen in the whole process," she said.

"When a company has significant buying power and relatively deep ties to its suppliers, they have the power to do it on their own without consensus from their peers," said Dan Garretson, an analyst at Forrester Research Inc. in Cambridge, Mass. Toyota has both and will use its muscle to streamline supply-chain costs, he said.

Delphi, Palm Launch Mobile Auto Service For Voice-Activated Dashboard System

In-vehicle Net services targeted for 2001

BY LEE COPELAND

Delphi Automotive Systems Corp. and Palm Inc. last week launched a joint venture aimed at servicing the in-vehicle, mobile Internet services platform the two companies introduced earlier this year.

The San Jose-based start-up, called MobileAria Inc., plans to provide a wireless subscription service to car owners by mid-2001. The deal also allows the world's largest auto-parts maker to cash in on its consumer electronics technologies faster, officials and analysts said.

In April, Delphi inked a deal with Santa Clara, Calif.-based Palm to create the Communiport Mobile Productivity Center (MPC), a voice-activated dashboard port that allows users to access their Palm devices from their vehicles.

At that time, the two companies were also considering a business plan put forth by entrepreneur Tom O'Gara to launch an automotive mobile services provider.

"In April, we knew we would launch a services business, because the Palm deal only covered the hardware side of the agreement," said Bob Schumacher, director of Delphi's Mobile MultiMedia business unit.

Six months later, that business plan became MobileAria, which is headed by O'Gara and currently has about five employees. Palm and Delphi hold minority equity stakes and board seats in MobileAria. The start-up also has venture capital backing from Mayfield Fund in Menlo Park, Calif. Officials didn't disclose the amount of the first-round investment.

THE VOICE-activated Communiport will support e-mail and Web-based news

MobileAria has yet to strike a deal with a cellular services provider. Still, O'Gara said the service will offer voice-activated wireless Internet access that supports applications such as e-mail and Web-based news services.

The pact also allows Troy, Mich.-based Delphi to cash in faster on its telematic (in-vehicle) communications technologies, officials and analysts said. Delphi produces the telematic hardware used with General Motors Corp.'s OnStar roadside assistance and concierge service, but it has taken four years to make the optional equipment available on 32 of 54 GM vehicle lines.

In contrast, it took just eight months to get the MPC unit to market, said Schumacher. MPC will be available through retail channels in December.

"The relatively short cycle time for consumer electronics works in Delphi's favor but against the car companies, because it takes five to seven years before they can think about retooling a vehicle," said Jim Hall, an analyst at AutoPacific Inc. in Tustin, Calif.

GM will begin a nationwide rollout of a premium OnStar voice-activated e-mail and Web service called Virtual Advisor next month. But the new service will be available only in 2001 models.

Dawn McGreevey, an analyst at Gomez Advisors Inc. in Lincoln, Mass., said consumers have had a long wait — nearly three years — to get interactive Web services from OnStar. Still, she said, she expects healthy demand for the service from drivers who would like to be more productive during their commutes.

Pricing for the MPC unit hasn't been determined, but officials said it will cost less than a Palm VII, which starts at $399. The 32-bit processor on the MPC allows users to cache and download data from the Palm devices.

TV 'Squatters' Jeopardize Time Line for Wireless

FCC chief says slow adoption of digital television could delay release of spectrum

BY BOB BREWIN

FEDERAL Communications Commission (FCC) Chairman William Kennard last week called television broadcasters "spectrum squatters" that hoard "the most valuable resource of the Information Age." He urged Congress to start charging the stations fees to force them to give up one of the two channels each one now occupies.

Kennard, in a speech at the Museum of Television and Radio in New York, said Congress allocated a second channel to broadcasters at no cost to allow them to broadcast digital TV (DTV) signals while continuing to air programs on their original frequencies.

The broadcasters can operate on both channels until 2006 or until over-the-air DTV serves 85% of the U.S. market. "Given the way that broadcasters are dragging their feet at the moment, we may not see that level of DTV penetration until 2025," Kennard said.

Edward Fritts, chairman of the Washington-based National Association of Broadcasters, said in a terse statement, "Despite the best efforts of broadcasters, digital television's potential remains in part unfulfilled because of FCC inaction on several critical issues."

The broadcasters association said 135 stations currently broadcast DTV. "It is regrettable that Chairman Kennard has failed the test of leadership. Sadly, he is trying to shift the blame for a faltering DTV transition," Fritts said.

According to Fritts, Congress gave the FCC authority to require all television sets to receive DTV channels, establish DTV/cable interoperability rules and require cable systems to carry DTV stations, but the FCC has taken none of those actions.

The FCC intends to auction the portion of the airwaves currently used by broadcasters to air digital signals — Channels 60 to 69 — next spring for advanced, high-bandwidth mobile telephone and data services. But companies that win that multibillion-dollar lottery can't use the spectrum until the stations shift their digital service back to their original frequencies in the Channels 2 through 13 band. The new mobile licensees may have to pay the broadcasters to speed up that shift.

Kennard said Congress could speed up the process by imposing a "spectrum-squatters fee" on broadcasters, starting in 2006. The fee would include a built-in yearly escalation clause to speed up the process of freeing additional spectrum needed for the development of broadband mobile networks that can support the wireless Web.

AT A GLANCE

FCC Chair vs. Broadcasters

- Calls TV station owners "spectrum squatters"
- Says they hoard airwaves worth $70B
- Says he wants to use the spectrum for Information Age applications
- Asks Congress to impose fees on broadcasters starting in 2006
- Says all televisions should be digital-ready by 2003

Tom Wheeler, president and CEO of the Cellular Telecommunications Industry Association in Washington, said Kennard's remarks illustrate the problem the U.S. wireless industry faces. "American citizens and entrepreneurs are on the short end of the spectrum stick," Wheeler said in a statement, pointing out that Japan has allocated 300 MHz for wireless, the U.K. 364 MHz and France 395 MHz, while "in the U.S., we are stuck at 189 MHz."

Lawrence Grossman, former president of both NBC's News Division and PBS, said he agreed with Kennard's statements about the broadcasters, but he added that he would like to see a fee imposed immediately.

Jeff Chester, a public-policy advocate at the Center for Media Education in Washington, said the chances of Congress imposing fees on the broadcasters are "slim," not only because of the high level of campaign contributions by broadcasters but also because of "invisible contributions" such as news coverage of campaigns. "No member of Congress will ever criticize broadcasters in an election year," Chester said.

The chances of getting Kennard's proposal through Congress are poor, Grossman said. "But Congress is becoming concerned about spectrum, which has become increasingly valuable," he said.

CERT Narrows Window for Security Holes

Advisory service will report all flaws within 45 days

BY JAIKUMAR VIJAYAN

Users who support public disclosure of security vulnerabilities got an unexpected boost recently.

Carnegie Mellon University's CERT Coordination Center security advisory service last week instituted a new policy under which it plans to publicly disclose all software flaws and vulnerabilities 45 days after they're first reported to the organization.

The policy builds on Pittsburgh-based CERT's usual practice of issuing periodic security advisories to its clients. Until now, such advisories have been restricted only to vulnerabilities that the center considers particularly serious and in need of immediate attention by users. But as part of the new policy, CERT will start issuing what are expected to be far more frequent "vulnerability reports" on all security problems that are reported to the center and can be proven true, said CERT member Shawn Hernan.

The new policy is a good thing for users, said Josh Turiel, a network manager at Holyoke Mutual Insurance Co. in Salem, Mass. "I'm a big believer in full disclosure [of security problems]," Turiel said.

Alerting the Public

A comparison of the number of alerts posted on various security sites last year:

SITE	NUMBER OF ADVISORIES/ALERTS	COMMENTS
CERT:	17	Prior to last week's change in policy, CERT restricted its advisories to the most serious vulnerabilities.
ICSA.Net	34	ICSA breaks its alerts into various categories: Red Hot, Hot, Important Fact and Hype. The number includes all categories.
SecurityFocus.com	575	Posts all vulnerabilities reported to it.

"Forty-five days is a very reasonable time for a vendor to fix a flaw. . . . [If] it is not done by then, users should know."

Under the new policy, CERT will pass on all relevant information about a specific security problem to the vendor. But after 45 days — or earlier, if warranted — the information will be released to the public, regardless of whether or not the problem has been fixed, Hernan said.

"The policy is really an attempt to balance the needs of the vendors with those of the general public," he added.

Releasing Info Questioned

CERT's plan to start making more frequent disclosures of software vulnerabilities comes at a time when some security experts are questioning the wisdom of publicly releasing such information.

In a keynote speech at July's Black Hat Briefings security conference in Las Vegas, for example, security researcher Marcus Ranum charged that the full-disclosure approach isn't improving computer security. Instead, Ranum said, it's only encouraging more attacks by providing would-be hackers with information on how to exploit vulnerabilities to break into systems.

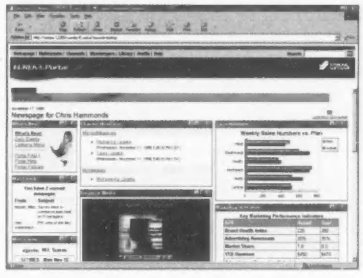
It's a contention that's challenged by security professionals such as Ryan Russell, an MIS manager at SecurityFocus.com, an online bulletin board and security portal in San Mateo, Calif. Last year, the SecurityFocus site posted 575 vulnerability reports.

"I'm firmly in the full-disclosure camp," Russell said. Giving users as much detailed information about vulnerabilities as quickly as possible helps companies take appropriate action to mitigate risks and protect themselves from attacks, he added.

"I would rather run the risk of having someone exploit a vulnerability I know about than have them exploit something I don't know about," agreed Turiel.

Any Data Warehouse Is Only As Good As The Brains Behind It.

With the demand for warehousing skyrocketing, you're juggling immediate eBusiness needs while creating an environment that can scale for future growth. DecisionBase™ is a complete software suite that gives you CA's smartest technologies for designing, deploying, managing, and leveraging your warehouse and other eBusiness applications. Its foundation is the industry-leading PLATINUM® Repository, ensuring a central, shared source of metadata for rapid deployment and better management of your warehouse and eBusiness applications.



What's more, DecisionBase exploits CA's patented, self-learning Neugents™ to mine complex data patterns, predict business problems, and suggest courses of action. Now, you can capitalize on opportunities before they happen — a huge competitive advantage.

DecisionBase also provides everything you need to help your knowledge workers make faster, better business decisions — from interactive BI dashboards to advanced visualization and portal technology. Plus, our CA Services™ team has the resources, knowledge, and experience you need to succeed.

Remember the name: DecisionBase from CA. It's the industry's most intelligent solution for building your warehouse now. Building it right. And, best of all, building it smart.

Call 1-800-890-7528 for more information on DecisionBase, or visit www.ca.com/decisionbase

Call us today to receive a FREE copy of the White Paper, "Putting Metadata to Work in the Warehouse," sponsored by Computer Associates and published by *techguide.com*. Mention ad code: AD DW 0153 DI

COMPUTER® ASSOCIATES
Software superior by design.

DecisionBase™
Intelligent Answers Here™

©2000 Computer Associates International, Inc., Islandia, NY 11749 All trademarks, trade names, service marks, and logos referenced herein belong to their respective companies

Online Retail Sales Could Double This Holiday Season

BY DAN VERTON

Experts predicted last week that fourth-quarter online retail sales will double compared with last year.

The forecast, by Gomez Advisors Inc., an electronic-commerce benchmarking firm in Lincoln, Mass., estimates that online retail sales during the fourth quarter will reach $11.4 billion, more than double the $5.2 billion in sales reported by the U.S. Department of Commerce during the same period last year. This year's growth will be driven by an increase in the number of people who view the Internet as a valuable shopping tool, according to Gomez. It will also be fueled by companies' efforts to improve service — particularly order fulfillment — for existing online customers, the study found.

Bob Smith, executive director of Shop.org, a trade group of online retailers, said he doesn't think Gomez's prediction is unreasonable, and he downplayed the impact higher fuel prices could have on consumer spending in the months ahead. However, fulfillment is a "top-of-mind" issue for all online retailers, said Smith. "Companies are very aware of what they need to do and that delivery on time is not only critical for satisfying the consumer, but getting the consumer to come back," he said.

Most companies this year have increased their investment in inventory planning, inventory management and merchandising, Gomez said. In fact, 81% plan to have real-time inventory management during the upcoming holiday season, according to the study.

Last year, many big electronic retailers got hammered when they entered the holiday buying season unprepared to handle the huge spike in online orders. As a result, the Federal Trade Commission fined seven major retailers, including Toysrus.com Inc., CDnow Inc. and KBkids.com LLC, $1.5 million each for not delivering orders on time. "Companies have a better feeling and more responsibility for getting products to the customers at the right time this year," said Barrett Ladd, an analyst at Gomez. "Many of the top toy firms have brought their fulfillment operations in-house, whereas last year they outsourced them," said Ladd.

The forecast by Gomez follows a similar study released last month by Boston-based research firm The Yankee Group, which predicted that online holiday sales would reach $9 billion this year. Yankee Group officials couldn't be reached for comment, but Ladd said the difference between the forecasts is likely due to differences in the types of companies and services included.

Holiday Rush

Online retailers prepare for the holidays

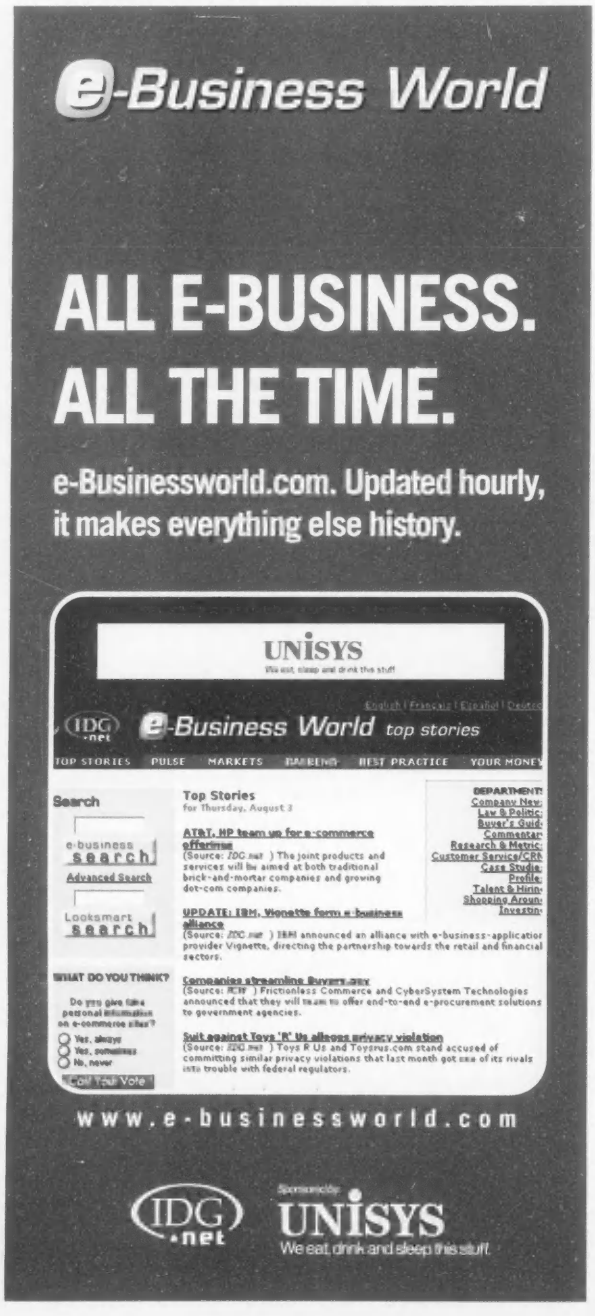
Forecast sales (Q4): $11.4 billion*

Major focus of retailers: Customer service and order fulfillment

Major initiatives:

- Redesigning Web sites
- Using more robust search engines
- Upgrading to real-time inventory management systems
- Moving order fulfillment operations in-house
- Forming teaming arrangements with vendors that have more established distribution centers
- Deploying Internet-based product return systems

*SOURCE: GOMEZ ADVISORS INC.



Lack of Privacy Policies Impedes E-Retailers

Lack of clear-cut, understandable privacy policies could be the biggest impediment to online retailers this year as they gear up for the hectic fourth-quarter holiday buying season.

A new study released last week by Cambridge, Mass.-based Forrester Research Inc. and Vividence Corp., a San Mateo-Calif.-based company that specializes in evaluating Web sites, found that the more satisfied online buyers are with a Web site's privacy policy, the more comfortable they will be when they shop at that site.

The Forrester study, "Web Buyers Speak Out About Privacy Policies," surveyed 400 Web buyers and analyzed their attitudes toward online privacy on eight major retail sites. The study evaluated the privacy policies of Amazon.com, Barbie.com, eToys.com, Fisher-Price.com, JCPenney.com, KBkids.com, Toysrus.com and Walmart.com.

The Web buyers rated each site's privacy policies from zero to 100, based on the ease of locating the policy, their overall satisfaction with the policy and their comfort level in shopping at the site after reading the policy. At least five of the sites received "mediocre" scores of between 60 and 76 because of policies that were difficult to understand or failed to explain terms and principles. The site that received the lowest score, a 39, used a text link that blended into the site's background and made the policy hard to find.

Although Forrester didn't identify the names of the Web sites that earned the mediocre or poor scores, the firm did announce that two of the eight sites, KBkids.com and eToys.com, finished ahead of the rest in all areas evaluated.

Marc Rotenberg, executive director of the Electronic Privacy Information Center, an online privacy watchdog group in Washington, called online privacy the "No. 1 consumer issue." He said online merchants have to do more to convince consumers that their private information won't be misused. "The policies generally are very weak," said Rotenberg. "People still don't trust that their information is not going to be abused." - *Dan Verton*

WHAT HAPPENED WHEN WE INVITED **THE WEB'S** TOP CAR DEALER TO

KICK OUR TIRES?

They took us for a test drive. And liked our performance so much they not only bought our hardware, but our e-business solutions as well. You see, Autobytel.com—the global leader in automotive e-commerce and services—was looking for help in maintaining its lead and accelerating its growth.

Not surprisingly, the people who came up with the idea of selling cars via the Internet came to another group of e-business innovators: the people at Unisys.

We're helping Autobytel.com with everything from **Unisys e-@ction Enterprise Servers** to building Web sites to handle their global expansion. And we'll be there to see the job through. But, then, with Unisys that's always the deal. www.unisys.com

UNISYS

We eat, sleep and drink this stuff.

©2000 Unisys Corporation. Unisys is a registered trademark and e-@ction is a trademark of Unisys Corporation.

BRIEFS

TurboLinux Gets $30 Million Investment

Linux vendor TurboLinux Inc. last week announced it has received $30 million in a third round of funding. This is the Brisbane, Calif.-based Linux software company's second cash infusion this year. In January, TurboLinux received $57 million. The new investment is being made by Fujitsu Ltd., Hitachi Ltd., IBM, Silicon Graphics Inc., Softbank E-Commerce Corp. and other corporate and venture investors.

Nasdaq Adds IT Execs

Nasdaq Stock Market Inc. in Washington, which has been criticized for its handling of some information technology issues, last week named two executives who are expected to help it cope with initiatives such as the conversion to decimal-based pricing and the rollout of a new front-end trading system.

Nasdaq announced that it hired Steven Randich as executive vice president and chief technology officer and appointed Anna Ewing to be senior vice president of systems engineering.

FCC Halts Review of America Online Deal

The Federal Communications Commission (FCC) announced last week that it's suspending its review of Dulles, Va.-based America Online Inc.'s proposed purchase of Time Warner Inc. in New York until after the Federal Trade Commission completes its own review. The FCC said it's "stopping the clock" on consideration of the purchase because the review "may be affected by the antitrust agency's determinations."

HP Puts Focus on Developing Markets

In an effort to narrow the "digital divide," Hewlett-Packard Co. said it will begin an initiative to provide technology and build markets in developing countries. The venture, called e-Inclusion, will seek to place some of HP's business focus on developing markets in Africa, Asia, Central and Eastern Europe and Latin America, the company said.

Exchange 2000 Users Laud New Capabilities

But say they're leery of installing the apps

BY JENNIFER DiSABATINO
DALLAS

A MID A LAS VEGAS-style display of laser lights and pyrotechnics, Microsoft Corp. officials worked hard to get current and prospective customers pumped up for the company's new line of messaging and collaborative software at the Microsoft Exchange and Collaboration 2000 conference here last week.

Users attending the conference said they were excited about the possibilities Exchange 2000 promises but said they were wary of the complex task of implementation. Some of those users — joint development partners who have begun the process — took part in a panel discussion and said the benefits are worth the effort.

Exchange 2000 has the potential to boost electronic business initiatives by serving as a development platform for corporate Web sites, said Vicki Fredrick, U.S.-based director of the Exchange migration at Aventis, a pharmaceutical conglomerate based in Strasbourg, France.

Aventis began to implement a beta of Exchange 2000 earlier this year as a Microsoft joint development partner. Fredrick said that once installed, Exchange 2000 will streamline administration by speeding application distribution and message processing. But the effort, still incomplete, involves a lot of work, she said. "You guys have got a learning curve ahead of you," Fredrick told a group of prospective developers at the conference.

Complex Process

A Microsoft spokesman acknowledged that installation will be a complex process but noted that the company delayed the launch of Exchange 2000 from June in part to expand efforts to make the process more manageable.

"I'm looking forward to the upgrade, but I'm also anxious about it," said Sean Smith, the Exchange administrator at Emery Worldwide in Portland, Ore. Because Exchange 2000 is made up of more discrete components than its predecessor, Smith said he will be able to "pass off more of the little stuff" to administrators at Emery's offices, instead of requiring them to download huge attachments.

While he and other administrators may not be 100% ready to start moving to Exchange 2000, Smith said, "How else are you going to learn?"

The panelists offered some suggestions to prospective users. For starters, they said, users need to recognize that Exchange 2000 is built on top of Microsoft's Active Directory, so companies without Active Directory will need to upgrade to that first.

"Know your existing environment," added Tom McCormick, the Exchange administrator at Marathon Oil Co. in Houston, another Microsoft joint development partner. Administrators will have unpleasant surprises if they don't know what they are migrating to in the new system, he said.

Companies that are considering hardware upgrades may find the installation of Exchange 2000 a good impetus, panelists and other users agreed. But Dan Guttman, Exchange administrator at The MTVi Group Inc., the online arm of New York-based MTV Networks, said he didn't have to upgrade his server to implement the new version. ◗

AT A GLANCE

Installing Exchange

Users who have begun installing Exchange 2000 offer the following tips:

- Install Active Directory if your company doesn't already have it.
- Know your current environment.
- Clean up databases as much as possible before moving data to Exchange 2000.
- Expect it to be a learning experience.

Exchange Moves Toward the Middle

When Microsoft unveiled Exchange 2000 last week, the company demonstrated cross-platform capabilities not previously seen in products from the software maker, analysts said.

This flexibility signals that Microsoft is responding to market forces and opening its messaging and collaboration platform for use with third-party applications, as well as by application service providers (ASP), analysts said.

The Exchange 2000 line is being released to the public this week, setting the stage for the expected release in the first half of next year of the next Office product and the much-hyped knowledge-management tool Tahoe. All are based on the new Web Storage System (WSS) technology, which will push applications toward a Web-browser interface and will allow users and developers to create and send documents across multiple platforms.

The replication abilities of WSS make Exchange more competitive with Lotus Development Corp.'s Notes, said Dana Gardner, research director at Aberdeen Group Inc. in Boston. Notes, meanwhile, is getting faster at replicating, he said, which shows that Lotus is watching Microsoft.

The market, not June's antitrust ruling by U.S. District Court Judge Thomas Penfield Jackson, spawned the new flexibility, Gardner said. And ASPs will increasingly be able to demand flexibility from software makers, he said.

– *Jennifer DiSabatino*

Microsoft Announces New Operations-Management App

BY KATHLEEN OHLSON

Microsoft Corp. last week detailed plans to release new operations-management technology based on software licensed from NetIQ Corp. in Santa Clara, Calif.

The product is for use with Windows 2000 and companion products such as the SQL Server database and Exchange Server e-mail system.

Microsoft said the software is scheduled to be released next summer. Included will be a product called Microsoft Operations Manager and a series of operations-management interfaces supporting technologies such as XML.

Microsoft said it's licensing NetIQ's software, also called Operations Manager, and will do additional development work before making it available to Windows 2000 users.

As part of the three-year deal, Microsoft will pay $175 million in licensing fees and as much as $6 million in joint-development funding, according to NetIQ. In addition, the agreement requires Microsoft to invest $5 million per year in NetIQ and to pay the company another $5 million annually to cover marketing expenses.

Meanwhile, NetIQ said it will develop a range of management products based on Microsoft Operations Manager for use on non-Microsoft platforms and applications beyond the Windows environment.

Pricing for Microsoft Operations Manager won't be disclosed until the software is ready for shipment, according to Microsoft. ◗

Don't know what your problem is?

That's a problem.

Congratulations. Your networks are more distributed than ever. And now, so are your network problems. How to deal? Our solution is to help you see your network so clearly you'll never get blindsided again. Because when you use our superior tools to measure, monitor and improve the performance of your network, you improve the performance of your business. Which solves a lot of problems.

Visual UpTime®

Visual Trinity™

Visual IP InSight™

Visual eWatcher™

Visual Benchmark™

Greater awareness begins at www.visualnetworks.com. Because a problem you can't see is a problem you can't solve.

VISUAL NETWORKS®

www.visualnetworks.com/cw
1-800-240-4010

©2000 Visual Networks Technologies, Inc. Visual Networks and Visual UpTime are registered trademarks of, and Visual Benchmark, Visual IP InSight, Visual Trinity, and Visual eWatcher are trademarks of Visual Networks Technologies, Inc.

IBM Bolsters Unix Server Line

Wave of high-powered systems hitting market

BY JAIKUMAR VIJAYAN

IBM THIS WEEK will boost its high-end Unix server family with a new system that features faster chips, larger memory support and better systems management capabilities, the company said.

The 24-processor p680 server will ship in the middle of next month and features technologies migrated from IBM's mainframes, said Scott Firth, an IBM director.

IBM'S 24-PROCESSOR p680 Unix server will ship next month

The server adds to a growing menu of next-generation Unix servers from which users will be able to choose during the next several months.

Within the past few weeks, Unix rivals Sun Microsystems Inc. and Hewlett-Packard Co. have announced major upgrades to their high-end portfolios. Sun announced its first UltraSPARC-III servers, and HP announced a 64-processor enterprise server it calls Superdome.

All of these systems represent a new generation of enterprise Unix servers and should offer substantially better performance and reliability than existing technologies, according to Rich Partridge, an analyst at Port Chester, N.Y.-based D. H. Brown Associates Inc.

All the servers are much more scalable than previous ones and can be partitioned into multiple smaller servers, making it easier for administrators to consolidate multiple applications on a single large server. Similarly, all the products support technologies that allow users to quickly add capacity or remove and replace faulty components without bringing the entire server down.

"It's a new generation of servers that are clearly pushing higher into the data center," Partridge said.

Highlights of IBM's new p680 server include the following:

- Faster, 600-MHz chips featuring IBM's Silicon-on-Insulator technology.
- A mainframelike capacity-upgrade-on-demand feature that allows users to quickly activate additional processors.
- A built-in service processor for monitoring and managing system performance.
- Support for up to 94GB of memory.

"We'll probably upgrade to the [IBM] servers" when they become available, said Hugh Hale, senior manager of information systems at Blue Cross/Blue Shield of Tennessee in Chattanooga.

Hale's company currently uses a 12-processor S80 server — the immediate predecessor to IBM's new system. "The line as a whole has performed well for us," Hale said. "It is reliable and offers very high performance."

Microsoft Opens Second Hands-on Technology Center

Labs help users test e-commerce apps

BY CAROL SLIWA

Microsoft Corp. last week announced the opening of a technology center in Austin, Texas, where users can design, develop and test e-commerce applications in a laboratory setting that may be more high-powered than their internal environments.

The 12,000-square-foot facility, which features Dell Computer Corp. hardware, marks the second of five planned Microsoft Technology Centers. In March, Microsoft opened a center in Waltham, Mass., for which Compaq Computer Corp. has provided the server infrastructure. Additional centers are planned for Toronto, Chicago and Silicon Valley.

Bob Laskey, the managing consultant overseeing the Austin facility, said his group targets engagements of two to eight weeks to help customers "through the hardest challenges of a development project" and assist them in deploying Microsoft's new line of .Net enterprise servers. Pricing is a weekly flat fee that includes software, hardware, network infrastructure and a team of Microsoft architects.

Laskey said the technology centers differ from prior Microsoft lab-type environments by offering customers access to a broader range of resources and experts. The Austin center now has five full-time consultants whose focus areas include Windows 2000, SQL Server 2000, Commerce Server 2000, BizTalk Server 2000 and other .Net enterprise servers.

Neil Iscoe, CEO of Austin-based eCertain, said his company spent about $20,000 for a week of access to the workspace, hardware, software and team of hands-on Microsoft consultants. That investment helped his company, which provides secure transaction services, determine that its Windows 2000 Advanced Server architecture will scale from handling 10,000 transactions per month to the anticipated 4 million transactions per month it expects to process two years from now, he said.

Iscoe noted that eCertain now runs on nine Dell boxes but it tested with almost 30 machines. "You can never do it yourself [in-house] for that amount of money. And if you think of the machines, people and time, the cost can be orders of magnitude greater if you go off in the wrong direction, particularly in the scalability area," Iscoe said. "If you have an architecture that doesn't scale, then really, no amount of hardware will be able to fix the problem. So you need to find these things out early."

Center Courting

- **Microsoft has opened** technology centers in Waltham, Mass., and Austin, Texas. More centers are planned in Toronto (this month), Mountain View, Calif., (next month) and Chicago (next April).
- **Service offerings include** performance tuning and scalability analysis, platform upgrades, security assessment and advanced development.

Compuware Warns of Weak Q2 Earnings

BY JAIKUMAR VIJAYAN

Mainframe software vendor Compuware Corp.'s warning of a weak second quarter may have partly resulted from users delaying signing software agreements in anticipation of new license options being offered for IBM's latest mainframe release, analysts said.

Farmington Hills, Mich.-based Compuware last week warned that its quarter ended Sept 30 would be weaker than expected because of a shortfall in license fees from its mainframe software. This marks the third straight quarter in which Compuware has failed to meet the consensus earnings expectations of Wall Street analysts.

Compuware said earnings are expected to come in at $474 million to $487 million, off sharply from $568 million in the same quarter last year. License-fee revenue is likely to range from $100 million to $105 million, less than half the $212 million recorded in last year's second quarter, the company added.

Buying on Hold

Part of the $2 billion company's problems this quarter may have resulted from users waiting for the new usage-based pricing models being offered in connection with IBM's just-announced 64-bit z900 mainframe, said David Floyer, an analyst at consultancy ITCentrix Inc. in Framingham, Mass.

The new IBM systems not only provide nearly twice as much performance as previous mainframes but also support a new usage-based software pricing model called Workload License Charges, which promises to make software licenses less expensive and more manageable during the next few years.

"A lot of people are going to be extremely reluctant [about] getting into long-term software license deals without first taking a look at the new option," Floyer said. "There's going to be a lot of reassessment of pricing models."

"A part of it has to do with IBM's new pricing model," agreed Judith Hurwitz, president of Hurwitz Group Inc. in Framingham, Mass. There are, however, a number of other factors that may also be contributing to a high-end software slowdown, she said. Many users, for instance, are grappling over whether to sign up for multiyear license agreements, as they have in the past, or for Internet-based application hosting services, she said.

"We are at a very complex time," Hurwitz said. "I think a lot of users are taking a step back and are trying to understand the value they can get out of different kinds of approaches."

Revenue Shortfall

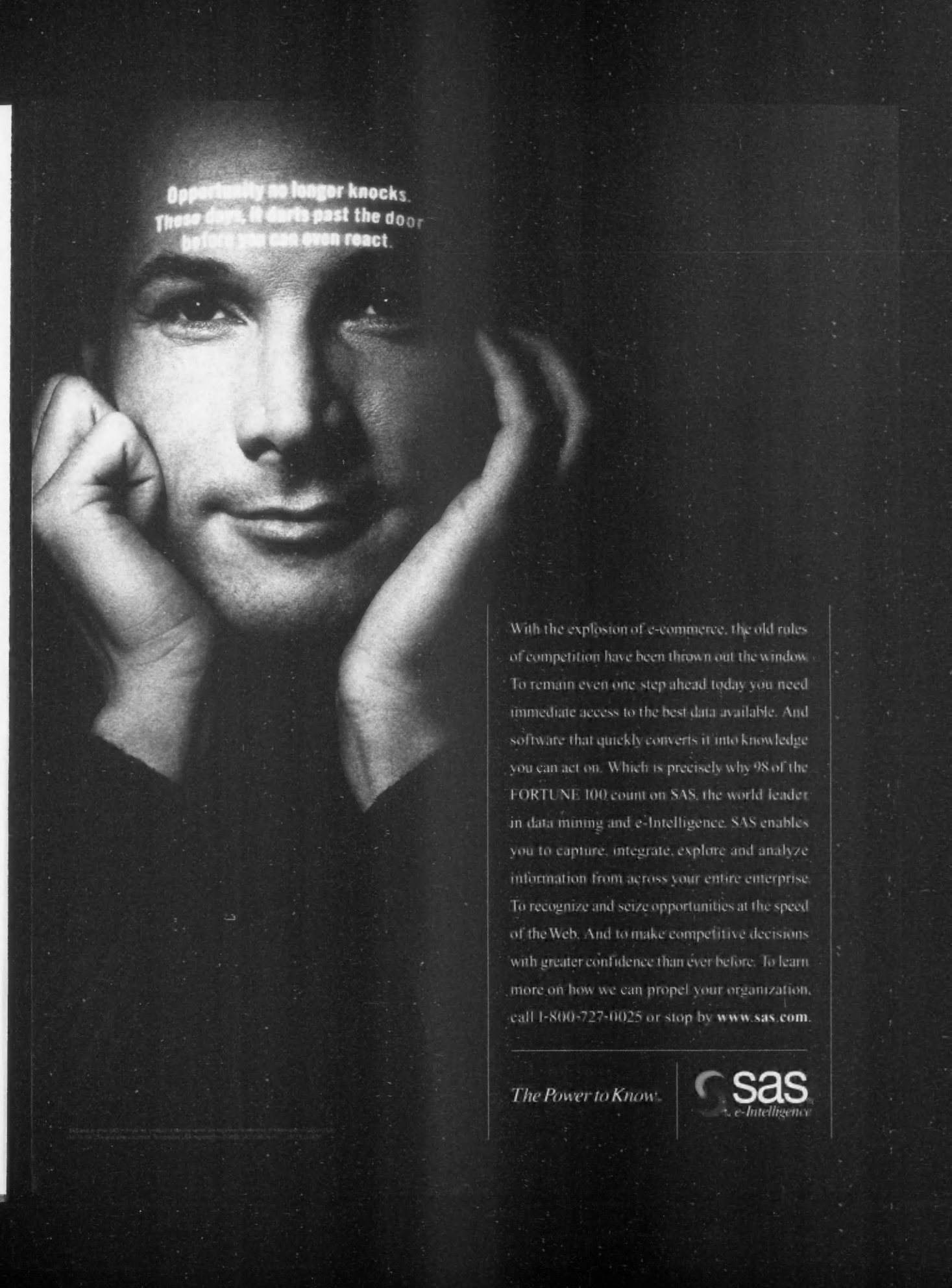
Compuware's estimates for the quarter ended Sept. 30:

Revenue:
Between $474M and $487M

Software license fee revenue:
Between $100M and $105M

Maintenance revenue:
Between $110M and $115M

Professional services revenue:
Between $264M and $267M



With the explosion of e-commerce, the old rules of competition have been thrown out the window. To remain even one step ahead today you need immediate access to the best data available. And software that quickly converts it into knowledge you can act on. Which is precisely why 98 of the FORTUNE 100 count on SAS, the world leader in data mining and e-Intelligence. SAS enables you to capture, integrate, explore and analyze information from across your entire enterprise. To recognize and seize opportunities at the speed of the Web. And to make competitive decisions with greater confidence than ever before. To learn more on how we can propel your organization, call 1-800-727-0025 or stop by **www.sas.com**.

The Power to Know.

sas
e-Intelligence

BRIEFS

Intel Waiting on Pentium III Relaunch

Intel Corp. won't relaunch the 1.13-GHz version of its Pentium III processor, which was recalled in August because of a technical glitch, until the second quarter of next year, an Intel spokesman said last week. That doesn't mean users will have to wait six months, however. Intel has said it expects to launch its new Pentium IV processor, expected to debut at 1.4 GHz, before the end of the year.

HP Still Eyeing Pricewaterhouse Unit

Hewlett-Packard Co. is still in talks with PricewaterhouseCoopers about purchasing the accounting firm's consulting division, HP CEO Carly Fiorina confirmed last week. "This potential acquisition is based on a belief that the days of talking to one company about business strategy and another company about technology are over," she said.

H-1B Visa Application Fees to Double

The White House is expected to sign a bill doubling the H-1B visa application fee from $500 to $1,000. The fee is charged to employers applying for workers under the program. The money will be used to help fund job-training programs for U.S. workers. Congress approved the increase last week.

Private Firms Getting Federal Competition

Some electronic government initiatives have the potential of competing with private enterprise, according to a study by several economists, including Joseph Stiglitz, a former chairman of the U.S. Council of Economic Advisers. One initiative criticized in the report was the U.S. Postal Service's electronic billing and payment service, called eBillPay. Private companies already offer similar services. The report, sponsored by the Computer & Communications Industry Association in Washington, calls for federal guidelines for such initiatives.

Continued from page 1

Chemicals

related, complex, fairly fragmented industry, all of which makes it quite ripe for some form of e-commerce," said Leif Eriksen, an analyst at Boston-based AMR Research Corp.

In AMR's April ranking of the top 20 Internet exchanges, six served chemical companies. That's partly because chemical companies regularly buy their raw materials from other chemical companies, so there's extra incentive within the industry to cut costs by doing business electronically.

"Most chemical companies are buyers and suppliers to each other. Reliance like this spawns a collaborative mentality," said Glenn MacKenzie, director of chemical industry solutions at WebMethods, aSan Francisco-based maker of software to link back-end systems and front-end Web sites.

IT Tradition

Compared with other manufacturing industries, the chemical industry also has a tradition of using IT to cut costs and drive innovation, like automating at the manufacturing plant level, Eriksen said.

In addition to its Web site, Eastman has two new Internet ventures — Paintandcoatings.com, an online exchange already up and running for the buying and selling of specialty additives, and ShipChem.com, a Web-based logistics services company for the chemical industry that's set to go live this month. Three more electronic-business spin-offs are due to launch by year's end.

"Our strategy is to get new revenues through new value-added services. Information technology is the value delivery system," said Fred Buehler, director of electronic business at the $4.6 billion, Kingsport, Tenn.-based specialty chemicals manufacturer.

FMC Corp., a $4.4 billion Philadelphia-based chemical company, is enabling one of its largest customers, PQ Corp., to place "machine-to-machine" orders for soda ash (an ingredient that goes into other chemicals that PQ makes) and other repeat buys directly into its SAP AG R/3 enterprise system via the Internet.

By the end of December, FMC will integrate 15 more customers into the automated system, which took less than four months to develop and test.

The big advantage is that employees at both the buyer and seller companies now need to pay attention only to those special orders or ones with which there are problems, CIO Edward Flynn told attendees at a chemical industry electronic-business conference here last week. Previously, employees manually handled all orders sent via fax or placed over the phone.

At Wilmington, Del.-based Du Pont Co., electronic business has involved adopting not one but several business models, said CIO Robert Ridout.

For example, the company sells its commodity products on various digital exchanges but sells its wide array of branded materials, such as Tyvek house insulation wrap and Lycra fabric, via 40 separate branded Web sites.

To jump the online business initiatives, Du Pont seeded each of its business units with an electronic-business leader and an electronic-technology leader and very small but focused electronic-business teams.

> Most chemical companies are buyers and suppliers to each other. Reliance like this spawns a collaborative mentality.
>
> GLENN MACKENZIE, DIRECTOR OF CHEMICAL INDUSTRY SOLUTIONS, WEBMETHODS

The company also has put on more than 50 workshops for business-unit executives who are encouraged to generate new ideas for selling their products over the Internet.

"It's all about idea generation," said Ridout. "We showed them sites like [online auctioneer] eBay and [online grocery service] Streamline.com and would ask them to apply the ideas to their own businesses."

On the whole, when it comes to electronic-business initiatives, most chemical companies are "still spending far, far more than they're benefiting," said Robert Koort, a chemical industry analyst at Deutsche Bank AG in New York. But that will change in the coming year, he predicted.

"Those who are going ahead first [with electronic-business projects] are going to be better entrenched with their customer base to the exclusion of those that don't act now. To the extent that IT enables them to make connections, we'll see a differentiation between best-of-class and worst-of-class," Koort said.

Continued from page 1

Supply Chain

efforts. Conaway last week was here at the Planet 2000 trade show, sponsored by i2 Technologies Inc.

In the next two years, Kmart aims to beef up its supply-chain and Web storefront operations, standardize and automate its ordering and fulfillment processes and make sure products get to stores when they're supposed to, said Conaway.

CONAWAY: Kmart plans to beef up its supply-chain and Web operations

Kmart will also be better able to forecast customer demand for its goods and improve its transportation operations.

Both Troy, Mich.-based Kmart and Caterpillar Inc. announced last week that they are working with Dallas-based i2 to revamp their entire IT platforms to join the electronic-business world.

The applications developed for these companies will eventually be sold to other companies within their industries, according to i2.

The partnership is just what Kmart needs, said Conaway. The company lacks integrated supply-chain processes, he said, and as a result, customers wind up going to stores looking for advertised goods that aren't available.

Moreover, the supply chain is "virtually zero" Web-enabled, he said.

Peoria, Ill.-based Caterpillar plans to let customers order and configure heavy machinery and other products via the Web and create a private online marketplace to connect its network of suppliers and dealers.

The 75-year-old maker of farming and construction equipment, which had revenue of $19.7 billion last year, hopes to squeeze out $100 million in costs during the first year the system goes live.

The ordering process on Caterpillar's legacy systems requires too much human intervention and takes too long to offer a build-to-order model for most of the company's customers, according to Bill Smith, a manager in the manufacturer's corporate information services department.

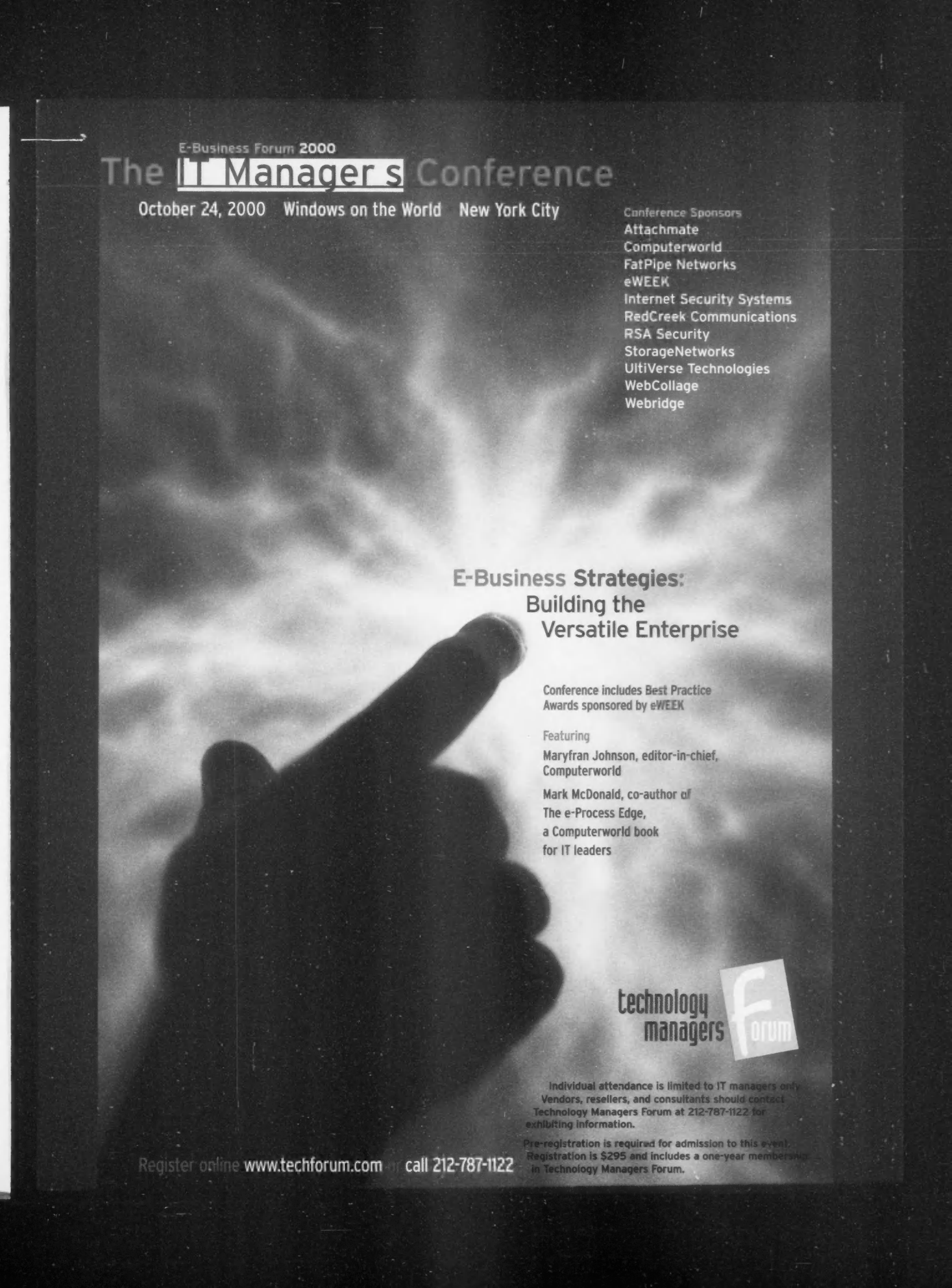
With a multitude of product options, Smith said, customers could order thousands of different configurations.

Some pieces are in place. Earlier this year, Caterpillar implemented i2's TradeMatrix digital marketplace software in its Performance Engine Products Division, which led to a $32 million reduction in product inventory and a 38% cut in assembly-line processing times.

However, Caterpillar's plans may not go down well with all of its approximately 5,000 suppliers, said Joshua Greenbaum, a principal at Enterprise Applications Consulting in Berkeley, Calif.

Interfacing with existing public and private online marketplaces is already putting stress on their IT resources, Greenbaum noted. Caterpillar may meet resistance unless it does something to "take away the technological burden" for its suppliers, he said.

Michael Bittner, a research director at AMR Research Inc. in Boston, said that although these are both significant projects that could benefit the two companies, they could also result in long-term, complex implementations.


E-Business Forum 2000
The IT Manager's Conference
October 24, 2000 Windows on the World New York City
Conference Sponsors
Attachmate
Computerworld
FatPipe Networks
eWEEK
Internet Security Systems
RedCreek Communications
RSA Security
StorageNetworks
UltiVerse Technologies
WebCollage
Webridge
E-Business Strategies:
Building the
Versatile Enterprise
Conference includes Best Practice
Awards sponsored by eWEEK
Featuring
Maryfran Johnson, editor-in-chief,
Computerworld
Mark McDonald, co-author of
The e-Process Edge,
a Computerworld book
for IT leaders
technology
managers forum
Individual attendance is limited to IT managers only.
Vendors, resellers, and consultants should contact
Technology Managers Forum at 212-787-1122 for
exhibiting information.
Pre-registration is required for admission to this event.
Registration is $295 and includes a one-year membership
in Technology Managers Forum.
Register online www.techforum.com or call 212-787-1122

It's now standard practice
to depend on Web Applications.

Now it's time for an industry standard to manage them.

Let's face it. You have to be on the leading edge of what has become known as e-business. But you cannot afford to lose sales, customers and brand reputation because of failed transactions. So your systems must be more than excellent. They must be failsafe.

Relax. Tonic has arrived.

Now you can feel comfortable about your company's dependence on web applications. Because the Tonic enterprise solution heralds a new era of web applications management.

Load testing and integrity assessment before going live. And on-going monitoring of systems beyond anything previously offered by a single company. That's Tonic.

Active within hours, not days. Easy to use with no retrofitting of your systems required. But with the scalability to simulate millions, not just thousands, of simultaneous users. After all, you plan to be that successful, right?

Suddenly the leading edge is a much more comfortable place to be.
www.tonic.com

TONIC™ Guaranteeing Your Net Works.™

Energy Companies Form Software Venture

Houston-based OpenSpirit should create new standards for energy industry

BY KATHLEEN OHLSON

CHEVRON CORP. and Royal Dutch/Shell Group have teamed up with a software unit of Schlumberger Ltd. to establish a jointly owned venture that will market a vendor-neutral application-integration framework for petroleum exploration and production activities.

The new venture, Houston-based OpenSpirit Corp., plans to continue developing collaboration and information-sharing technology that was created by a wider group of energy companies and software vendors. That group was known as the OpenSpirit Alliance.

San Francisco-based Chevron, The Hague-based Shell and New York-based Schlumberger said a commercial release of the OpenSpirit technology should be ready for shipment this quarter.

The companies will own equal shares of the venture, with Schlumberger holding its stake through its GeoQuest business unit. Houston-based GeoQuest markets software and data-management services to petroleum companies.

The OpenSpirit framework was previously marketed by PrismTech Ltd., which has licensed the technology to the new OpenSpirit venture. PrismTech developed the middleware, but the oil companies wanted technical ownership and the ability to extend the framework, so they bought it from the U.K.-based software vendor, said Steve Jennis, PrismTech's CEO. Terms of the deal weren't disclosed.

Cross-Platform Development

The OpenSpirit technology is based on standards such as Needham, Mass.-based Object Management Group Inc.'s Common Object Request Broker Architecture, and it supports cross-platform development and deployment of software on Unix and Windows NT systems.

Randall Nottingham, an analyst at The Yankee Group in Boston, said OpenSpirit will improve efficiency for energy companies.

"Communications [between petroleum companies] are notoriously complicated and difficult" because the companies have proprietary electronic document systems for each business relationship, Nottingham said.

The software would enable companies to communicate through a central network, exchanging information and files, he said.

But OpenSpirit is competing with other groups, such as the Oil Field Services Portal in Houston, to adopt standards for energy companies.

"They can't all be successful, but some parts [from each group] will be adopted," said Nottingham. ◗

Automaker Consolidates E-Commerce

DaimlerChrysler to launch $500M Net-focused unit

BY KATHLEEN OHLSON

Furthering its effort to catch up to rival automakers such as Detroit-based General Motors Corp. and Dearborn, Mich.-based Ford Motor Co. on the Internet, DaimlerChrysler AG last week said that all of its e-commerce operations and investments are being consolidated into a new subsidiary being launched with $500 million in funding.

The subsidiary, called DCX Net Holding, was described by Stuttgart, Germany-based DaimlerChrysler as the nucleus of a corporatewide e-commerce initiative aimed at cutting operational costs and making the company more efficient and agile in areas ranging from purchasing to development, production and sales.

DaimlerChrysler said DCX Net will be responsible for overseeing its business-to-business, business-to-customer and business-to-employee activities.

Included in the initiative is the company's ownership stake in Covisint, an online exchange created jointly by DaimlerChrysler, Ford and GM. DCX Net will also manage existing investments, which total $290 million, in e-commerce companies such as Powerway Inc. in Indianapolis and The Cobalt Group Inc. in Seattle.

The subsidiary "will forge alliances, enter into joint ventures and invest to promote [our] e-business activities," said Eckhard Cordes, the DaimlerChrysler management board member responsible for corporate development and information technology. In addition, DCX Net will oversee DaimlerChrysler's interest in Venturepark Incubator AG, a Berlin-based venture-capital firm that invests in e-commerce companies.

Heading the new subsidiary are John Stellman, vice president of mergers and acquisitions at DaimlerChrysler, and Olaf Koch, the company's vice president of corporate e-business.

DCX Net will have offices in New York, Detroit, Tokyo, Stuttgart and Palo Alto, Calif. It will receive support and technical advice from the DaimlerChrysler research lab operation, the company said.

DaimlerChrysler was slower to detail its e-commerce plans than Ford and GM, but it began announcing a series of Internet-related projects this summer. Included are an upgrade to its Web sites aimed at U.S. auto buyers and an internal Web-based technology infrastructure that's intended to link all aspects of its vehicle design, production and marketing operations. ◗

JUST THE FACTS

All Rolled Into One

DCX Net Holding:

- Will receive $500 million in funding from parent company DaimlerChrysler AG
- Will include business-to-business, business-to-customer and business-to-employee activities, as well as online exchange Covisint

Nobel Physics Prize Awarded to IT Pioneers

Kilby invented integrated circuit

BY JOY PARK

Jack Kilby, an inventor at Texas Instruments Inc. who developed the first integrated circuit in 1958, last week was jointly awarded this year's Nobel Prize in physics along with two other scientists who also were cited for work that "laid the foundations of modern information technology."

Sharing the award with Kilby are Herbert Kroemer, a physics professor at the University of California at Santa Barbara, and Zhores I. Alferov, who is the director of the A. F. Ioffe Physico-Technical Institute in St. Petersburg, Russia. Kilby was given half the $915,300 prize by the Royal Swedish Academy of Sciences in Stockholm. Kroemer and Alferov will share the other half for their separate individual efforts to develop the semiconductor technology used in transistors.

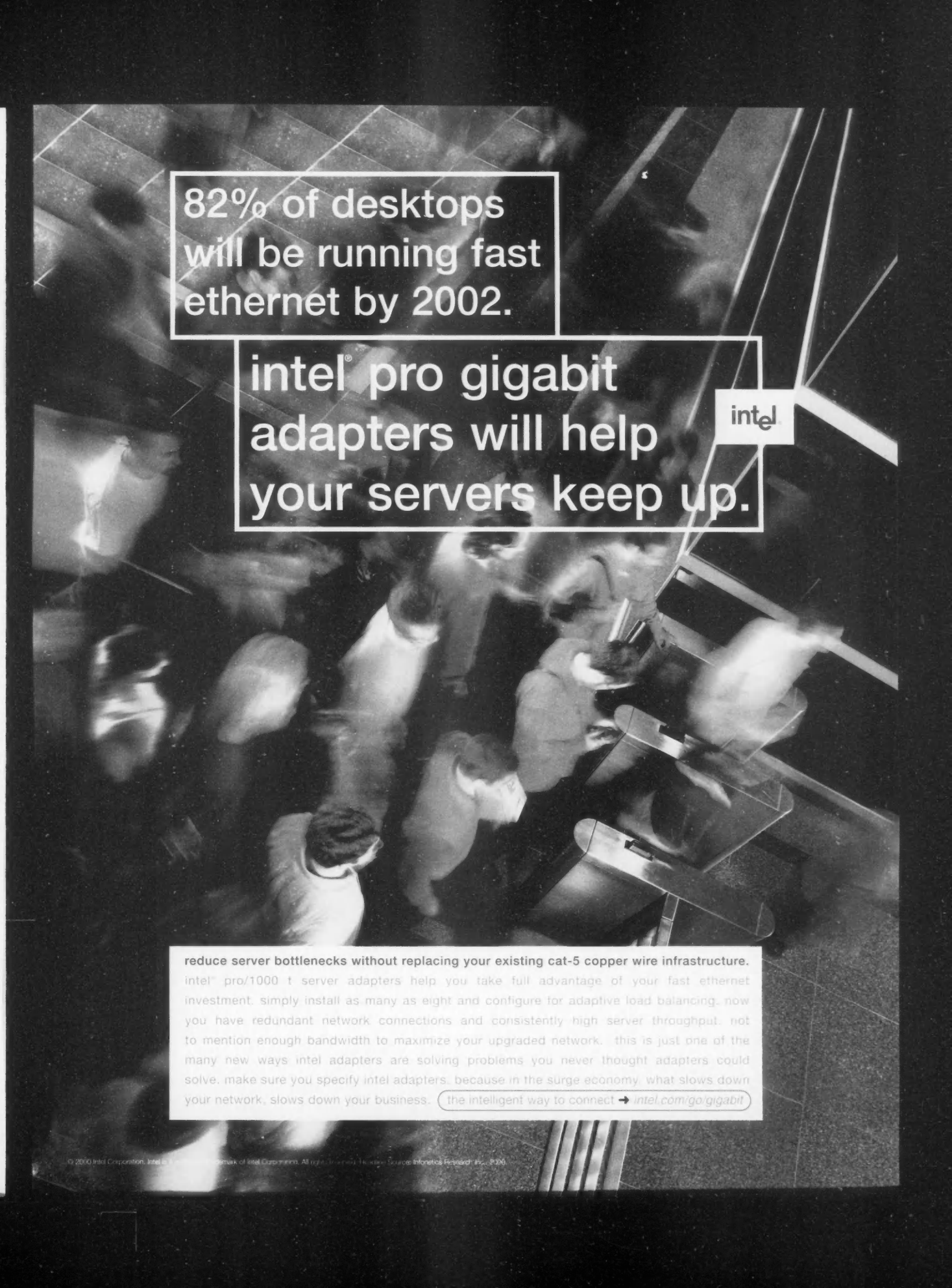
KROEMER'S work changed thinking on transistors

In an explanation of the physics award, the Royal Swedish Academy noted that Kilby, 77, and the late Robert Noyce of Intel Corp. are both considered the inventors of the modern integrated circuit. Kilby created the first device, while Noyce developed a chip as it would later be manufactured, using materials such as silicon and silicon dioxide, the academy said.

However, Kilby "was first with his patent application, and Noyce knew of this work when he filed his own application" related to the technology, the Swedish academy added. Although Noyce wasn't eligible to share in the Nobel award because of his death in 1990, the academy lauded him as "one of the most important founders of Silicon Valley."

Kroemer, 72, was cited for developing semiconductor heterostructures consisting of layers of gallium arsenide or aluminum gallium arsenide while working at RCA Corp. and Varian Associates Inc. in the 1950s and early 1960s. Alferov, now 70, did similar, though separate, work in Russia during the 1960s.

Kroemer's work showed that transistors based on heterostructure technology could be superior to conventional ones, especially for amplifying currents and for high-frequency applications. Devices and semiconductor lasers based on heterostructures are used in satellite communications and in products such as optical data storage systems, mobile phones and CD players. ◗


82% of desktops will be running fast ethernet by 2002.
intel® pro gigabit adapters will help your servers keep up.
intel
reduce server bottlenecks without replacing your existing cat-5 copper wire infrastructure.
intel® pro/1000 t server adapters help you take full advantage of your fast ethernet investment. simply install as many as eight and configure for adaptive load balancing. now you have redundant network connections and consistently high server throughput. not to mention enough bandwidth to maximize your upgraded network. this is just one of the many new ways intel adapters are solving problems you never thought adapters could solve. make sure you specify intel adapters. because in the surge economy, what slows down your network, slows down your business.
the intelligent way to connect ➜ intel.com/go/gigabit
© 2000 Intel Corporation. Intel is a registered trademark of Intel Corporation. All rights reserved. Number Source: Infonetics Research, Inc., 8/2000.

Presenting The Indu Desktop Manag

Web Management™

Backup/Disaster Recovery

Database Management

Monitoring

SERVER MANAGEMENT

Application Management

Network Management

Centralized Security Management

Single Sign-On™

Integrated Encryption

Firewall With Authentication

Virus Protection

SECURITY MANAGEMENT

Centralized User Administration

Malicious Web Content Detection

EnterpriseDiscovery™

Event Management/Correlation

Problem Management

Business Process Views™

ENTERPRISE MANAGEMENT

Predictive Management

Real World Interface™

Performance Management

Workload Management

OS/2

UNIX

Windows 98, 95, 3.1, CE

Windows NT

NetWare

EXTENSIVE PLATFORM COVERAGE

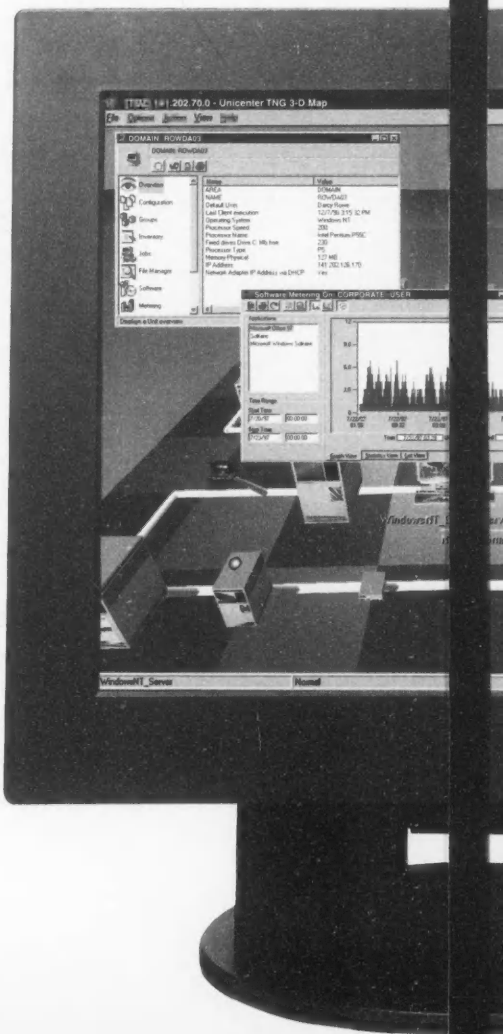
OS/390

OpenVMS

LANs, WANs, and Internet

TCP/IP, IPX, DECnet, SNA

AS400



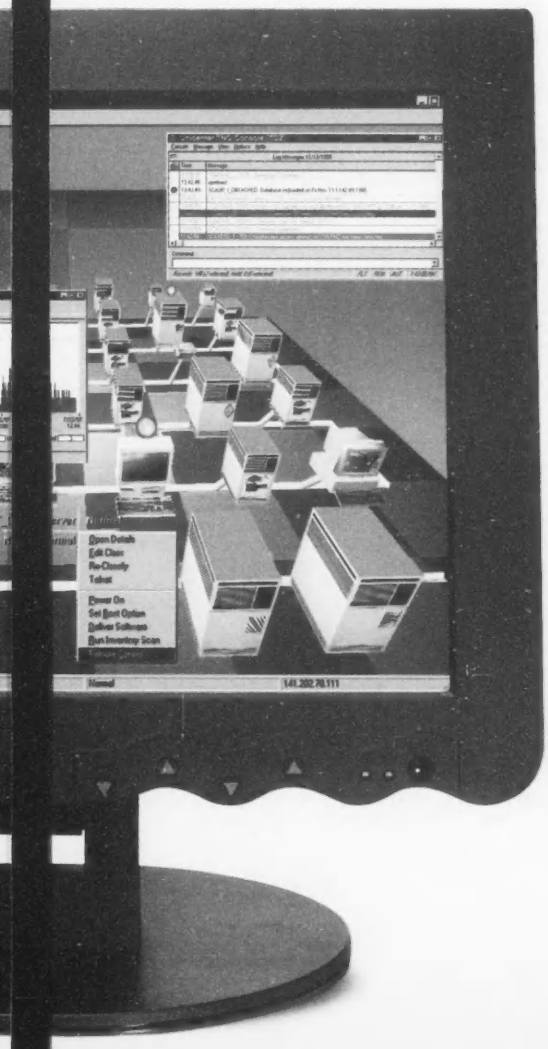
COMPUTER ASSOCIATES®

Software superior by design.

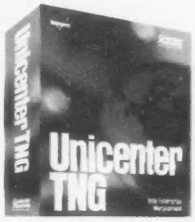
©1999 Computer Associates International, Inc., Islandia, NY 11788-7000. All product names referenced herein are trademarks of their respective companies.

stry's Only Complete ement Solution.

Session Recording
Multi-Processor Support
Stealth Viewing
Roving Call-Back
Multi-Host Viewing
File-Transfer With Crash Recovery
Remote Access
REMOTE CONTROL
Integrated NT Security
Remote Reboot



Software Metering/Auditing
Software Maintenance
Software Inventory
Y2K Compliance Check
ASSET MANAGEMENT
Hardware Inventory
Configuration Management
Financial Tracking
Policy-Based Management
Historic Analysis
Hands-Free OS Installation
Roaming Users Support
SOFTWARE DISTRIBUTION
Broadcasting
Event Monitoring And Automation
Secure Data Transport System
Dynamic Groups
Push/Pull
N-Tiered Distribution



Yes, all of these features and functions can be found in one solution: And you can find out more by making one phone call. Call today and find out how the industry standard for network and systems management can help you get all of your desktops under control.

For more information, call 1-888-UNICENTER, or visit www.cai.com/ads/desktopmgmt

Unicenter TNG®

First Data Spins Off E-Payments Company

Disparate payment systems to be bundled under eOne Global umbrella

BY MARIA TROMBLY

IT MAY BE A LITTLE late getting into the game, but Atlanta-based First Data Corp., the leading credit-card processor in the U.S. and owner of Western Union Holdings Inc., launched a $600 million electronic-payments company last week called eOne Global LP.

The company will combine all of First Data's electronic-payments businesses, including a business-to-business payments service for use in online exchanges and a tool that lets companies electronically pay federal and state taxes.

But except for the tax business, all of the online payments battlegrounds are already dominated by other, quicker companies, according to Paul Jamieson, an analyst at Lincoln, Mass.-based Gomez Advisors Inc. First Data has to move fast to gain ground on the dot-com start-ups, he said.

"This is their way of playing catch-up," Jamieson said. "Quite frankly, that should have been done a year ago.

"It is the small start-ups that are looking at niche innovative processes that either enhance or create a whole new segment in the online payments area," he continued. "That's where the innovation is happening.

Planning to Expand

First Data has bundled all of its disparate electronic-payment businesses under the umbrella of eOne Global.

For example, eOne Global's SurePay, a joint venture with Plano, Texas-based Entrust Technologies Inc., will provide a way for companies to make secure payments to other businesses in online exchanges and to consumers. But it won't be up and running until the fourth quarter, according to Garen Staglin, president and CEO of eOne Global.

Another division of eOne, CashTax, enables companies to pay taxes to the federal government and 20 states. It's a leader in its field, with 2 million business clients making 36 million annual payments worth more than $1 trillion.

EOne Global also plans to expand into a variety of other electronic-payments products.

Take person-to-person electronic payments. Currently, the leader in this space is X.com Corp.'s PayPal. However, PayPal has recently begun charging for some of its services and has announced plans to raise rates even further, giving potential competitors a chance to break into this market.

First Data will own 75% of eOne Global. The other 25% will belong to iFormation Group, created by The Goldman Sachs Group Inc., The Boston Consulting Group and General Atlantic Partners LLC to back online businesses.

AT A GLANCE

Crowded House

EOne Global is planning to move into a crowded business-to-business payments field.

Used by: Businesses to send money to vendors and suppliers on online exchanges

Leader: None yet, but several players are emerging, including Financial Settlement Matrix.com, a consortium that includes Citigroup Inc., Wells Fargo & Co. and software maker i2 Technologies Inc. Another contender is Clareon Corp.

Volunteer Brings Computers to the Bedouin

Third World land gets boost from IT

BY MARIA TROMBLY

Sean Osner returned to Egypt from Jordan three weeks ago. He was in a Bedouin community of between 1,500 and 2,000 people in a village called Safawi, close to the country's border with Iraq. "It was like Mars," he said. "That kind of terrain — very barren. Lots of rocks around."

Osner set up a community center with 10 Intel 486 computers and five Pentium IIIs for the local residents — mostly shepherds and goatherds — to share with four nonprofit women's organizations.

At first, it might seem that Bedouins would have no need for the Internet, especially compared with more basic concerns like food and shelter. But the Internet can help local residents get better medical care and educations and it may even help bring money into the community.

"One of the things we designed the community center for was to help the local women find markets in other parts of the world for their products," Osner said. "That would keep those traditions alive in their community."

Osner's trip to Jordan was on behalf of the United Nations Information Technology Services (UNITeS), which received a mandate from UN Secretary-General Kofi Annan this past spring to bridge the digital divide in Third World countries.

Working on another IT-related assignment for United Nations Volunteers (UNV), which coordinates the volunteers for the UNITeS program, Osner (sean@tacc.ednet.net) recently visited the Egyptian village of El Ghar. There were 400 phones for 100,000 people, and those 400 phones shared a single phone line.

'Overwhelming Demand'

At a technology access community center in the Egyptian city of Zagazig, which has around 1 million inhabitants, 4,000 people were waiting for a chance to use one of four available computer terminals. "There is an overwhelming demand that we can't possibly fill," Osner said.

Visitors, many of whom — even the university students — have never touched a computer, learn how to use word processors and e-mail, do Internet searches and set up e-commerce sites.

One page set up by a local entrepreneur can be found at *www.tacc.egnet.net/tacc/rabab*. Rabab's Leather Products is a one-stop shop for made-to-order outerwear.

While Osner's Jordan assignment was for only two weeks, other missions can last as long as two years, said UNV spokeswoman Nanette Braun.

Volunteers receive travel expenses, insurance and a living stipend that varies country by country but usually amounts to between $800 and $1,500 per month. People can apply by visiting the UNV web site at *www.unv.org*.

Mutual Benefits

Experts say the volunteers could play a key role in helping businesses in developing countries hop on the New Economy bandwagon — not just in setting up the computers but in teaching people to use them.

"The shortage of skilled people is one of the biggest problems developing countries face in joining the digital revolution," said Bruce McConnell, president of McConnell International LLC, which does technology and management policy consulting in more than 120 countries.

And not only the local economy benefits, said Ernest Wilson, director of the Center for International Development at the University of Maryland in College Park. Markets are expanding fast in developing countries, he said, and that's one reason companies like Cisco Systems Inc. and Motorola Inc. have been active in overseas education efforts for years.

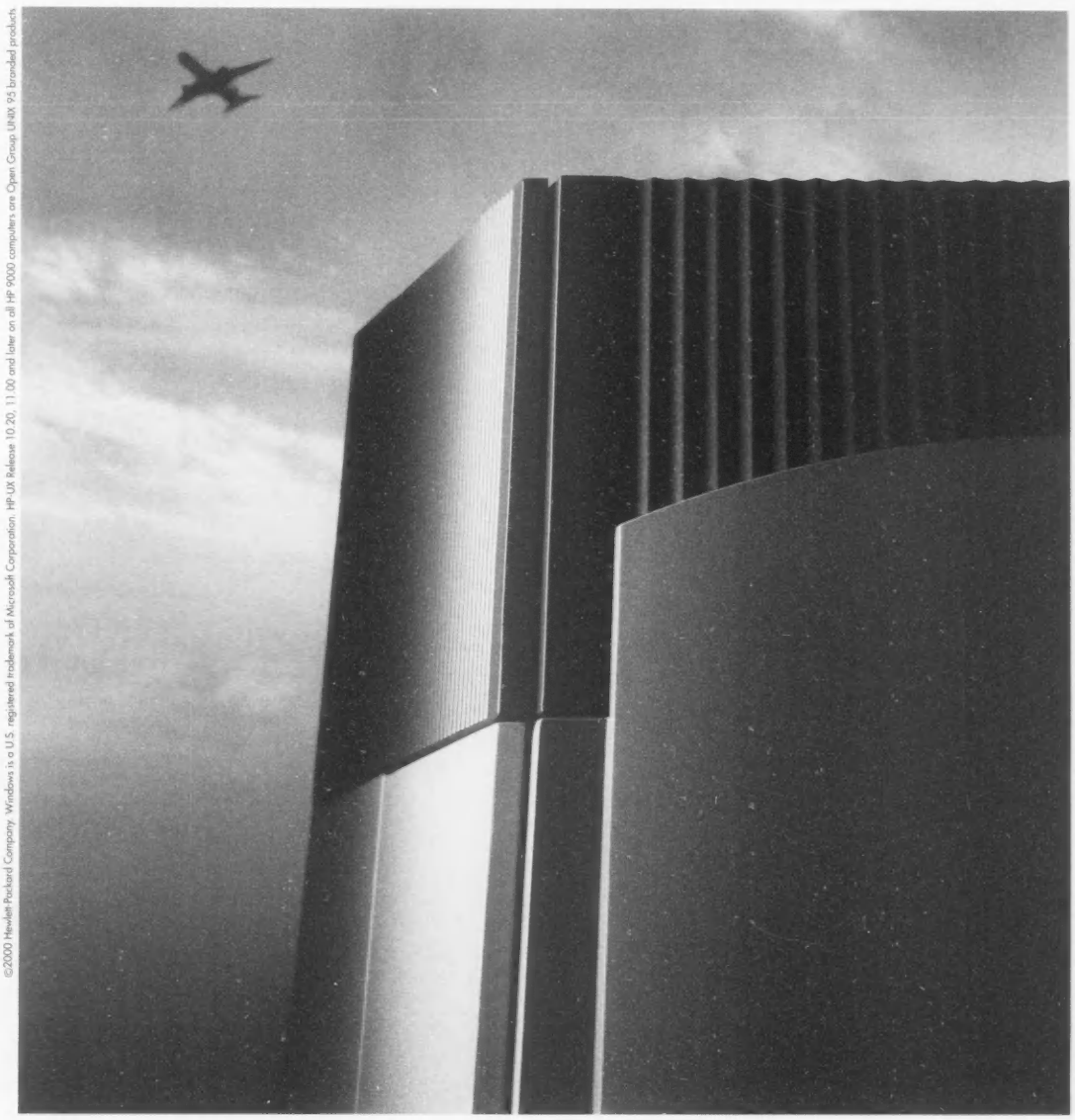
For example, Cisco donated $3.5 million to UNITeS in July for educational programs in more than half of the world's least-developed countries and said it would deliver the investment through its global Cisco Networking Academy.

"That's where the markets are going to be," Wilson said.

So far, 23 UNITeS volunteers have taken assignments in developing countries, including Benin, Botswana, Burundi, the Central African Republic, Ecuador, India, Namibia, South Africa and Tanzania. Six additional posts are in the pipeline for Bhutan, Jordan and Mongolia. For more information about the project, visit the UNITeS Web site at *www.unites.org*.

SEAN OSNER (left), a volunteer for the United Nations Information Technology Services, got Bedouin women in Safawi, Jordan, online

©2000 Hewlett-Packard Company. Windows is a U.S. registered trademark of Microsoft Corporation. HP-UX Release 10.20, 11.00 and later on all HP 9000 computers are Open Group UNIX 95 branded products.



Most servers replace yesterday's servers. This one replaces tomorrow's.

Introducing hp 9000 superdome, the first enterprise server with the flexibility to match its power. Flexibility that's ready for IA-64, and flexibility to run multiple operating systems like HP-UX, Linux, Windows 2000, and others yet to be. Capacity is flexible too. Scale it up or scale it back, paying less when you use less. With hp 9000 superdome, your options are open. Because tomorrow's another day. hp.com/superdome

First Linux Development Platform Standards Are Released

BY TODD R. WEISS

The first version of the new Linux Development Platform Specification (LDPS) was released last week, clearing the way for the adoption of standards that will make participating Linux platforms work together seamlessly.

The announcement was made by the nonprofit Free Standards Group at the Fourth Annual Linux Showcase & Conference in Atlanta.

The new LDPS standards will be adopted by some of the largest Linux distribution companies, including Caldera Systems Inc., Corel Corp., Red Hat Inc., SuSE Linux AG, TurboLinux Inc. and VA Linux Systems Inc., the group said.

"This is a big thing," said Scott McNeil, an open-source strategist at VA Linux Systems in Fremont, Calif. "Predating Linux, Unix was always trying to be unified, with no success." Now, with the adoption of Linux specifications, the future of Linux standardization looks brighter, he said. "To come out with the first version of a new standard is big stuff."

The specifications will mean that Linux developers will be able to work with standardized tools, kernels and libraries that will allow their applications to function properly across other Linux distributions, McNeil said.

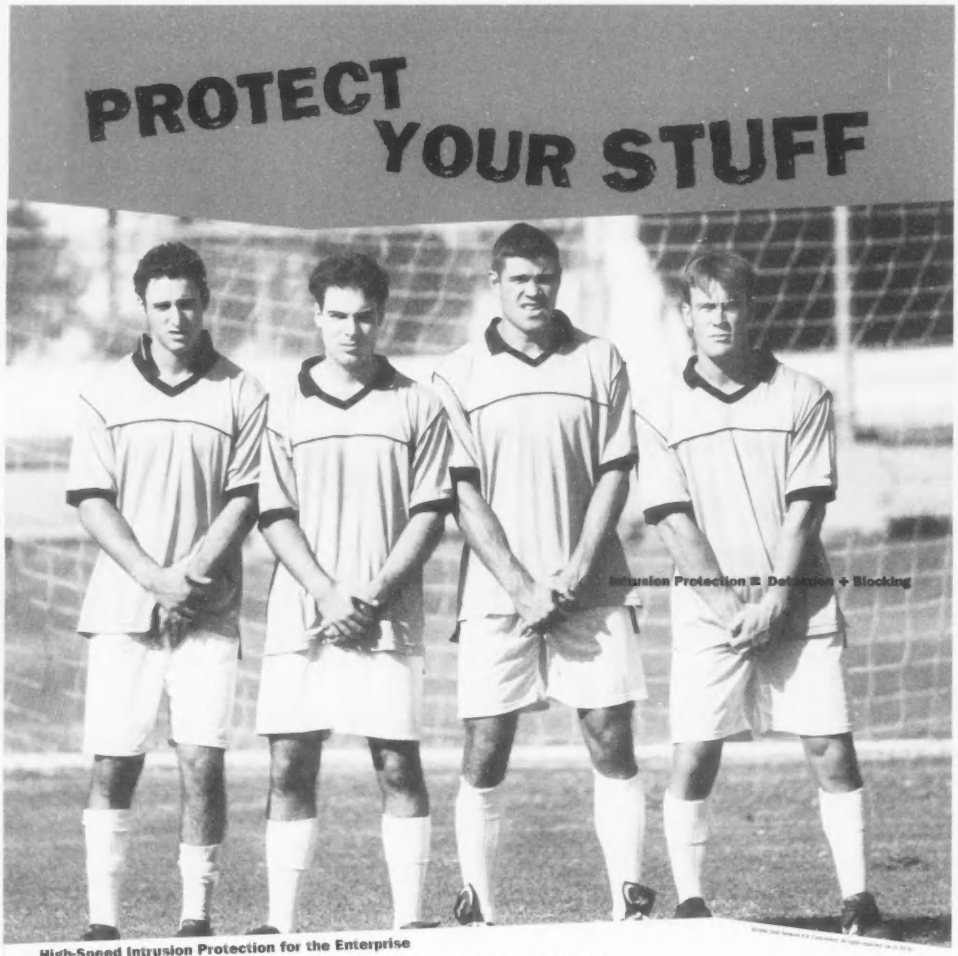
Broader Use

By using the LDPS, developers will be able to create and distribute software more quickly across the spectrum of Linux distributions, including Caldera OpenLinux 2.4, Conectiva Corp.'s Linux 5.1, Corel Linux OS Second Edition, Debian GNU/Linux 2.2, Linux-Mandrake 7.0, Red Hat Linux 6.2, SuSE Linux 6.4 and TurboLinux 6.0, according to the Free Standards Group.

"Standards allowing interoperability and portability are of crucial importance for Linux," said Dan Kusnetzky, an analyst at International Data Corp. in Framingham, Mass. "Survey after survey indicates that IT management will feel comfortable adopting Linux only when they feel confident that applications based upon one distribution of Linux will be easily transportable to other Linux platforms."

Dan Quinlan, president of the Free Standards Group, said in a statement that "LDPS is but the first of many planned specifications that are aimed to help both open-source developers and companies port applications to Linux. Having a single development reference to work from will greatly simplify the process of building Linux-based applications."

The Free Standards Group is a nonprofit corporation organized to accelerate the use and acceptance of open-source technologies through the development, use and promotion of standards.



High-Speed Intrusion Protection for the Enterprise

Don't leave your Gigabit and Fast Ethernet segments exposed to hackers and insiders. Our award-winning intrusion protection products guard high-speed segments and servers better than anyone else in the game.

We deliver centrally managed agent- and network-based protection to every server or segment, VPN client or desktop in the enterprise, inside or outside the firewall. The other guys can't.

Don't believe it? We can prove it.

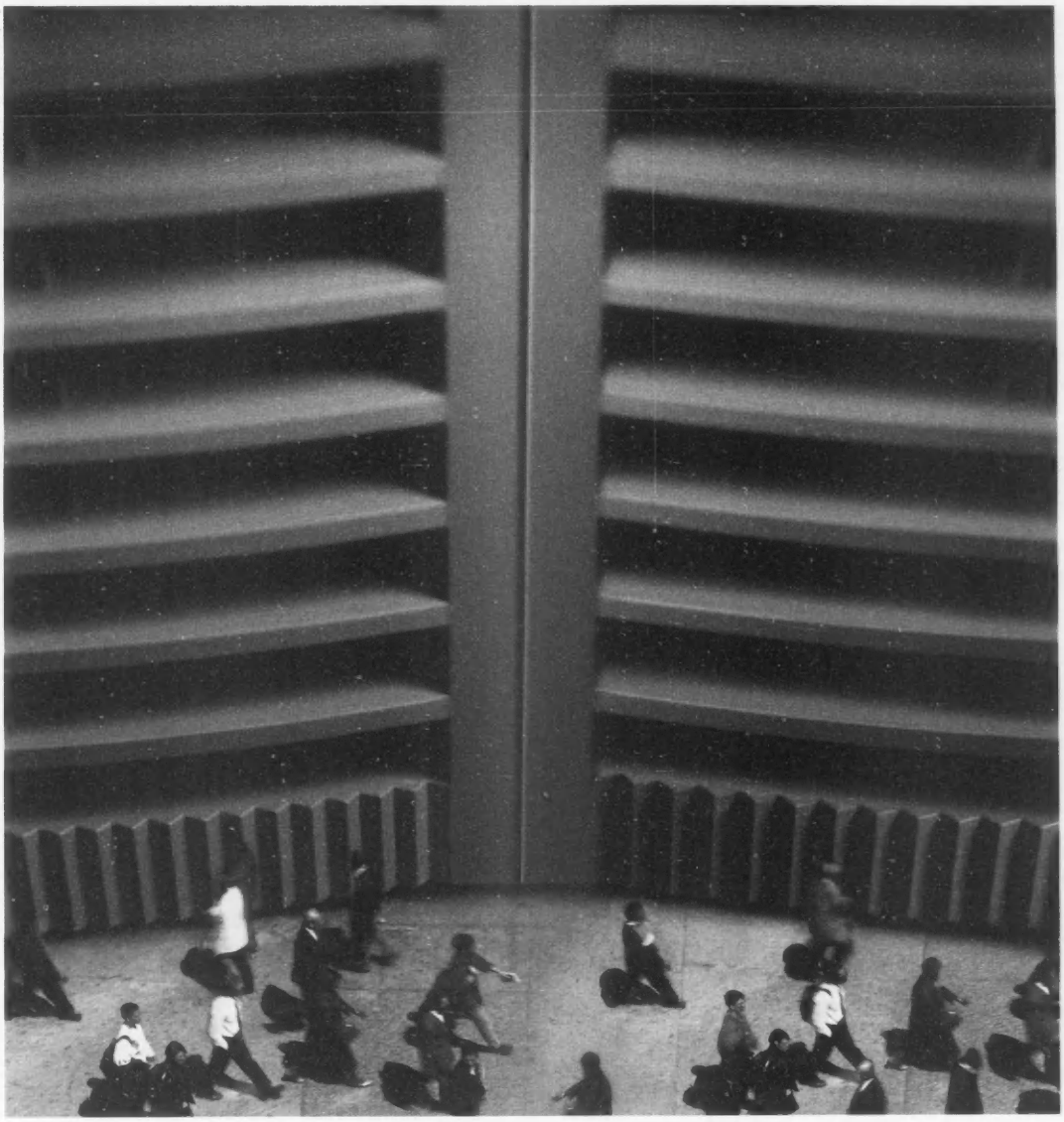
www.networkice.com/cw-eval

Be sure to download the independent & comparative **Lab Test Summary Report on Intrusion Detection Systems** from Mier Communications Inc.

Ni Network I·C·E

Enterprise Intrusion Protection at the Speed of Light™

©2000 Hewlett-Packard Company



A box without service is a box.

With hp people, hp 9000 superdome becomes a solution, instead of a server.

Service is comprehensive and included. We handle site planning, integration services, customized training, and monitoring.

It's service made simple. So simple, in fact, that we can adjust your capacity over the phone.

Without, ironically, a service call. hp.com/superdome

hp

invent

BRIEFS

Notes App Vendor to Work With Exchange

Cambridge, Mass.-based IT Factory Inc., the world's largest independent vendor for Notes-based applications, announced last week that it's working with Microsoft Corp. to build collaborative applications for Exchange 2000 products and a standard architecture for both platforms. CEO Lars Munch Johansen said IT Factory isn't abandoning its Notes users but is trying to open up applications, which may include helping customers migrate from Lotus Domino/Notes to Exchange.

IBM to Build Plant

IBM last week announced plans to build a $2.5 billion chip-making plant in East Fishkill, N.Y. The company said the plant is part of its $5 billion capital-investment plan to support its semiconductor business.

Intel Reshuffles Execs

Intel Corp. last week announced three high-level management changes: Mike Splinter is now executive vice president and general manager of the technology and manufacturing group; Paul Otellini will take over management responsibility for the Intel Architecture Group; and Albert Yu, a senior vice president, will run an emerging-business unit.

NEC, Hitachi Agree to Optical Net Alliance

Furthering an alliance that began with memory chips, Japan-based firms NEC Corp. and Hitachi Ltd. have agreed to develop optical networking systems together. Products resulting from the alliance are expected to be rolled out between April and September next year.

Gateway Hit With Suit

A class-action lawsuit filed last week in California alleges that San Diego-based Gateway Inc. misled customers when it offered free Internet access but did not reveal that many users might incur long-distance telephone rates when connecting to the service. A Gateway spokesman declined to comment.

Oracle: More Than Just The Database These Days

Condensing 75 products into two is firm's latest move in becoming an e-business

BY DAN VERTON

When Oracle Corp. CEO Larry Ellison called the PC "a ridiculous device" at the European IT Forum in 1995, many industry onlookers chalked up his comments to little more than a personal rivalry with Microsoft Corp. Chairman Bill Gates.

However, when Ellison repeated those words at this month's Oracle OpenWorld conference in San Francisco, people listened as Ellison described Oracle's transformation from a database vendor only to a full-fledged e-business focused on the Internet.

"Software is destined to become a service," said Ellison. "We look at every [application service provider] not as a threat but as a potential customer."

According to Ellison, Oracle wants to change the way software is manufactured and sold. As a first step, the company has embarked upon a somewhat risky plan to consolidate its 75 different product offerings into two Web-centric packages.

"We engineer our products to work together. It's a fundamentally different view of the world" — one that's particularly different from the traditional systems integration model, Ellison said.

And Oracle has taken steps to prove it. In fact, according to Chuck Rozwat, executive vice president for server technologies, the company saved a billion dollars last year by "eating its own dog food" — that is, by using its own software to convert Oracle from a traditional business to an e-business.

Users seem to be paying attention. "We're seeing the shift to the Internet in our users as well," said Rich Niemiec, president of the International Oracle Users Group in Chicago. "The fact that they use their own software is huge. Users think [Oracle is] more likely to fix glitches."

The key factor in Oracle's plans has been its recently released Oracle9i Database server and Oracle9i Application Server (iAS), which consolidated more than 75 of the company's products. The iAS release also includes a patent-pending Web-cache technology that works with server clusters to dramatically increase Web performance and is able to tolerate machine failures.

"Oracle is far more than a database company," said Phil Russom, director of business intelligence at Hurwitz Group Inc. in Framingham, Mass. "In hindsight, I can now see that what I once thought was an unrealistically aggressive and possibly dangerous product consolidation plan has now turned out to be a long-range and accurate vision of what is required for a broad, scalable and robust platform for Internet-based applications."

However, the consolidation of products has both an upside and a downside, said Russom. Although it may simplify licensing and integration for many customers, he said, others may be forced to buy the application server in order to get the individual products they need, such as Oracle's reporting tool. "This may increase integration tasks and may possibly increase the cost of the software," he noted.

And many long-time Oracle users say they aren't happy with pricing changes that have accompanied the new products. Some customers told *Computerworld* that they're so upset by what they view as exorbitant capacity-based pricing that they're actively evaluating alternatives to Oracle [News, Sept. 18, Oct. 9].

There are other risks to Ellison's long-term vision as well. "I think the main missing element of their ASP platform is a competitive [Enterprise JavaBeans] application server," said Mike Gilpin, an analyst at Giga Information Group Inc. in Cambridge, Mass.

AT A GLANCE

Bringing in The Bucks

Oracle's growth for the first quarter of fiscal 2001:

Revenue:	$2.3B
Net income:	Up 111% to $501M
Database licenses:	Up 32% to $585M
Application licenses:	Up 42% to $156M
Service revenue:	Up 8% to $1.5B

SOURCE: ORACLE CORP., SEPTEMBER 2000

Wall Street Whacks Tech Stock Values

BY KATHLEEN OHLSON

The fall is proving to be more than just a season for many technology companies, including Apple Computer Inc. and Dell Computer Corp.

Apple and Dell were on a long list of information technology vendors that last week warned Wall Street that their earnings for the quarter ended Sept. 30 will fall below expectations. Others on the list include Intel Corp., Silicon Graphics Inc., Storage Technology Corp., Compuware Corp. and Lucent Technologies Inc.

Apple dropped a bombshell Sept. 28, reporting that fourth-quarter operating earnings would be about $110 million — 33% lower than the $165 million expected. On Oct. 4, Round Rock, Texas-based Dell said its third-quarter earnings would grow only 7% over second-quarter sales of $7.67 billion.

Apple's stock experienced Wall Street's wrath, falling from $53.50 on Sept. 28 to $19.63 in trading last week. Dell's stock remained steady, dropping from $28.19 Oct. 4 to $23 in trading last week.

Analysts said PC manufacturers are suffering as a result of lower consumer demand.

"People have already bought the equipment they need, maybe because of Y2k, so there's a backlash," said Terry O'Brien, an analyst at Branch, Cabell & Co. in Richmond, Va.

Consumers don't feel a need to buy a new computer, even with the releases of Microsoft Corp.'s Windows 2000 and Intel's Pentium IV, O'Brien said.

Additional Factors

Concerns over higher interest rates, a European economic slowdown, the value of the euro and higher oil prices also helped produce lower PC sales, according to analysts.

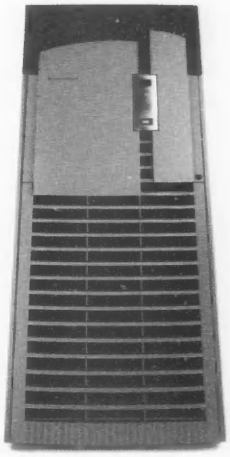
"Investors will stay on the sidelines with PC manufacturers ... going forward," O'Brien said. Investments will stay flat or decrease during the next six months or longer, unless interest rates decrease, oil prices ease and capital expenditures and personal spending increase, he said.

But other analysts said they disagree. "These fears aren't justified, but it won't stop people from selling in the short term," said Patrick Dunkerley, an analyst at Securities Corporation of Iowa in Cedar Rapids, Iowa.

During this current period of slumping sales, Dunkerley said, it pays to be a buyer and reinvest in other good names such as EMC Corp. in Hopkinton, Mass., and Network Appliance Inc. in Sunnyvale, Calif.

A key development for the PC manufacturers will come this week when IBM reports its earnings. "It could pick up the industry. ... [IBM] is the microcosm of the industry," said Gary Helmig, an analyst at Wit SoundView Group Inc. in Stamford, Conn.

©2000 Hewlett-Packard Company



The box is only as good as the thinking outside of it.

hp 9000 superdome is more than an enterprise server,
it's an enterprise solution.
It's a team of thoughtful people and smart hardware that adjusts
to a very specific future – yours.
This is the first generation of a new, more complete way of managing your business.
One in which comprehensive service and system integration are parts of the process,
not expensive afterthoughts.
hp 9000 superdome is the first step into an internet infrastructure that's always on,
always flexible, always exactly what you need.
Not more. Or less. Just exactly.
Look ahead, at hp.com/superdome

hp
invent

Anywhere. Anytime. Any device.
89th & 5th
45th & Madison

Introducing Microsoft® Exchange 2000 Server. Web collaboration is a must in the new economy. The new, enhanced Exchange 2000 Server, along with Windows® 2000 Advanced Server, provides our most reliable messaging and collaboration platform ever. With Web-connected devices, you can now collaborate and access information via enterprise-ready, Web-based solutions. What's more, these Web solutions are built with the tools you already know and are easily managed using the Windows 2000 Active Directory™ service. To find out more about upgrading, just visit microsoft.com/exchange

Microsoft Exchange 2000 Enterprise Server

Where do you want to go today?

Microsoft®

MARK HALL

The new IT leader

LIKE MOST *Computerworld* readers, you probably got where you are by proving your technical chops first and your managerial prowess sometime later. Trading war stories about the ins and outs of S/390s, Unix, database schema or network topologies is a good way to stay in touch with your team.

MARK HALL is *Computerworld*'s West Coast editor. You can contact him at **mark_hall@computerworld.com.**

So it's natural for you to consider the same kinds of skills in others as you promote department managers and even your successor. But that would be a mistake.

This is not to disparage hands-on smarts. Technical talent will always be needed. The lack of it has set back important corporate business objectives, directly hurting the bottom-line performance of too many organizations. But a different brand of IT management savvy is essential in the Internet era. One new skill you should be seeking is outsourcing management.

Like it or not, most of what an IT staff does today will be outsourced in the next three to seven years. Desktop application support. Server management. Software upgrades. Backups. You name it. In the name of the almighty ROI, these classic insider IT tasks are going out the door along with some of your best people who used to do them.

Not so long ago, it was critical to understand not just what a system did, but how. Without knowing how, you couldn't determine whether IT projects had a chance to succeed, whether management was asking for too much or whether an ambitious developer was overpromising.

Those days are vanishing. It's far more important to find and promote people in IT who understand more about developing relationships between users and outsourced suppliers. The new IT leaders will know instinctively which service provider will do the right job for the right price. They will know whether an SLA is right for the user, how much IT needs to supervise the relationship or whether to simply let the end user do it on his own.

This week's cover story by Gary H. Anthes (see page 80) reveals the many ways in which poorly chosen application service providers can undermine IT objectives. His report points to a need for IT to groom new managers who understand more about constructing business relationships than they do about cool new features in Windows 2000.

The good news amid the bad in Anthes' story is that CIOs increasingly understand that they need to develop outsourcing managers as much as, say, Java programmers. The war stories won't be the same, but the bottom-line value to the company will be better. ◗

DON TENNANT

At long last, 3Com makes the right choice

SPUTTER. SPUTTER-SPUTTER. Look! 3Com is going to crash and burn! No, wait! It's coming out of the tailspin! It's going to make it!

That was close! Good thing 3Com finally had the sense to replace the pilot. The last thing we need is another IT vendor that becomes an acquisition target due to an inability to compete.

That's exactly what stood to happen if longtime CEO Eric Benhamou had not announced last month that he will eject on Jan. 1 so Bruce Claflin can take over. And the timing was impeccable. Benhamou's descent came as 3Com announced its results for the quarter that ended Sept. 1. The company managed to put a positive spin on the fact that it suffered a net loss of $41.3 million, only because it had taken a *real* dive the previous quarter, when it lost $163.7 million. That enabled 3Com's public relations flack to say with a straight face that Benhamou was "not making this transition when 3Com is in trouble and is headed in the wrong direction." When you consider that for the same quarter last year the company actually made quite a bit of money — $113.6 million and change — it's a stretch to contend that the company was out of trouble when Benhamou announced his exit.

DON TENNANT is *Computerworld*'s assistant news editor. Contact him at **don_tennant@computerworld.com.**

I never thought Benhamou had any business sitting in the pilot's seat in the first place. I remember interviewing him eight years ago and being tremendously entertained by the fact that his idea of an interview was showing me a PowerPoint presentation about his company. What kind of a CEO needs to rely on a bunch of PowerPoint slides to convey his thoughts? The same kind of CEO, perhaps, who would abandon his big enterprise users by exiting that market after those same users spent lots of money, which in turn enabled 3Com to report figures way up in the black — $506.3 million in net income. That's what Benhamou did in March.

But 3Com can't be faulted too harshly for the timing of the change at the top. Although Claflin should have become CEO when he was brought on board in July 1998 as president and chief operating officer, at least 3Com didn't wait until it was too late. That's the fatal mistake Digital Equipment made.

Before he made the move to 3Com, Claflin was

SPECIAL ADVERTISING SUPPLEMENT

Storage Industry Directory

& Buyer's Guide

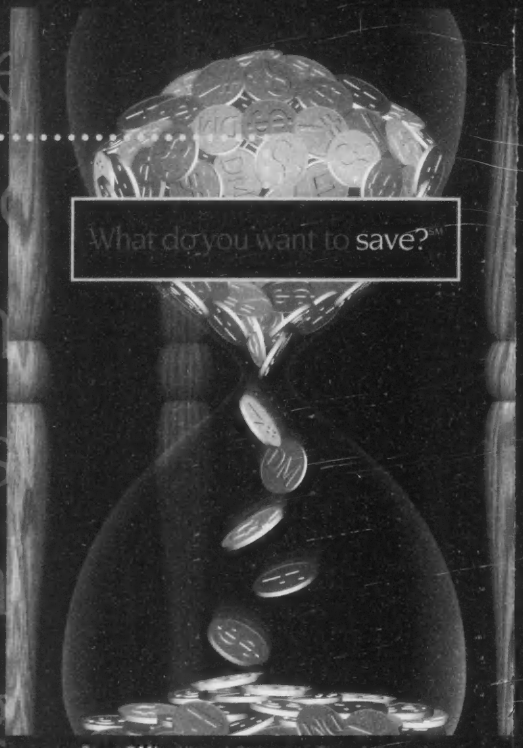
October 16, 2000

SNIA
Storage Networking Industry Association

COMPUTERWORLD
ENTERPRISE BUSINESS SOLUTIONS

IDC
Analyze the Future

aproductspre
rvacationsre
presentation
memosdisks
spacetimeha
filesrecordsg
timetomarke
jobsavailabili
paperhourso
daysmoneyp
informationh



Open SAN • Virtual Storage • Tape Automation

When your company information is unavailable, you waste valuable time as well as money and resources. Open SAN solutions from StorageTek™ save you from scheduled and unscheduled downtime so you can get more done. These intelligent solutions maintain fast data access and availability, no matter how quickly your business grows. Get your FREE SAN Survival Guide CD by visiting www.storagetek.com/weboffer/cwguide

STORAGETEK
INFORMATION *made* POWERFUL™

SNIA
Storage Networking Industry Association

The mission of the Storage Networking Industry Association (SNIA) is to promote the use of highly evolved, widely accepted storage network systems across the IT community – efficient, interoperable systems that meet the needs of today's organizations and can cope with the projected requirements of future applications. This Storage Industry Directory & Buyer's Guide is intended to be the industry's most comprehensive listing of the major participants in this burgeoning market.

The SNIA's relationship with Computerworld is providing an awareness of and access to the latest information on storage networking and advanced storage technologies to IT users and vendors. Our collective vision is to become the leading source of information, education and guidance for the industry by promoting the evolution and acceptance of industry standards among vendors, implementers and users. We endeavor to accomplish this by producing the highest-quality industry conference with our twice-annual Storage Networking World® featuring an unparalleled Interoperability Lab program as well as producing a comprehensive series of topical White Papers.

This Storage Industry Directory & Buyer's Guide is yet another important component of our integrated industry information offering. I invite you to explore and consider the expertise, resources and storage solutions provided by the companies listed and profiled in this publication.

Regards,

Larry Krantz
Chairman, Board of Directors
Storage Networking Industry Association

IDC
Analyze the Future

The storage market is exploding like never before! The total worldwide systems market will surge to $46.3 billion in 2003, driven primarily by networked storage.

For companies that hope to gain the advantages of storage-area network solutions, the next great challenge is communication and the ability to identify components of integrated solutions, quality service providers and implementers as well as suppliers of technologies that will both interoperate and meet future storage-user demands. Companies and organizations will make investments in storage systems for a variety of reasons, all of which can be mapped to three basic business objectives: to increase revenue, decrease expense and reduce risk.

With the information provided in this unique Storage Industry Directory & Buyer's Guide, storage-solution-seekers will find a ready group of companies poised to address their demands. IDC is proud to be a leader in analyzing and educating the storage market. We are similarly pleased to be a sponsor of this important industry directory.

Regards,

John T. McArthur
Vice President, Worldwide Storage Research
IDC

COMPUTERWORLD
ENTERPRISE BUSINESS SOLUTIONS

This Storage Industry Directory & Buyer's Guide was created and assembled as a custom published Supplement to Computerworld by the Computerworld Enterprise Business Solutions unit in conjunction with the Storage Networking Industry Association (SNIA). It is intended to be an annual publication and a key part of the storage market initiatives resulting from Computerworld's unique strategic alliance with the SNIA. Computerworld acknowledges and thanks International Data Corp. (IDC) for its sponsorship of this endeavor. We also say *thank you* to our advertisers in this supplement.

Company listings were compiled from an industry survey conducted by Computerworld's Enterprise Business Solutions unit together with association member companies supplied by the SNIA. Companies listed with a profile and their logo paid a small fee for this upgraded listing – all listed companies were offered this option. The information presented in these profiles, including the designation of the Storage Products and Services marketed by them (see below) and their contacts, was provided directly by the companies themselves. Computerworld, the SNIA and IDC are not responsible for the accuracy of the information provided.

Copyright© 2000 Computerworld Inc. All rights reserved.

Storage Products and Services Legend

DM =	Data Management	SD/S =	Storage Devices/Subsystems
OSM =	Online Storage Management	SNI =	Storage Network Infrastructure
S =	Services	SRM =	Storage Resource Management

3Com
5400 Bayfront Plaza
Santa Clara, CA 95052
408-326-5000
www.3com.com

3PARdata Inc.
4245 Technology Dr.
Fremont, CA 94538
510-413-5999
www.3pardata.com

3ware
701 E. Middlefield Rd., Suite 300
Mountain View, CA 94043
877-883-9273
www.3ware.com

Pam Jacobs, Vice President, Marketing
pam.jacobs@3ware.com
Jim McDonald, Chief Technology Officer/Co-Founder
jim.mcdonald@3ware.com
Joe Sarrentino, Vice President, Marketing
joe.sarrentino@3ware.com, 408-497-6936

Founded in 1997, 3ware designs innovative storage solutions that meet the needs of Internet applications; access, back-up, security and management – without requiring that customer adopt new standards or deal with unfamiliar technologies. *(SD/S,DM,OSM)*

Acer American Corporation
2641 Orchard Pkwy.
San Jose, CA 95134
408-432-6200
www.acer.com

Adaptec
691 S. Milpitas Blvd.
Milpitas, CA 95035
408-945-8600
www.adaptec.com

ADIC
11431 Willows Rd. N.E.
P.O. Box 97057
Redmond, WA 98073
800-336-1233
www.adic.com

Eric Brodersen, Executive Director, Marketing
eric.brodersen@adic.com, 425-895-3240
Bill Britts, Executive Vice President, Sales & Marketing
bill.britts@adic.com, 425-895-3445
Jonathan Otis, Senior Vice President, Technology
jonathan.otis@adic.com, 425-895-3495

Offering automated libraries, innovative storage management software, Fibre Channel Storage Area Network (SAN) solutions, and Network Attached Storage (NAS) appliances, ADIC is a leading drive-independent storage solutions provider to the open systems marketplace. *(SD/S,SNI,DM,OSM,S)*

AditiNet Inc.
1035 Putman Dr.
Huntsville, AL 35816
256-721-1976
www.aditinet.com

Advanced Computer & Network Corporation
5001 Baum Blvd., Suite 680
Pittsburgh, PA 15213
412-683-9010
www.acnc.com

Gene Leytarovich
gene@acnc.com, 800-213-2667

The company manufactures high-performance cost-effective departmental and enterprise-level data storage systems and recovery solutions.

Advanced Media Services Inc.
10 Upton Dr.
Wilmington, MA 01887
800-466-0813
www.amsstorage.com

Bob Jangro, Vice President
bjangro@amsstorage.com, 978-658-1870
Dan Donahue, Manager, Technical Support
ddonahue@amsstorage.com, 978-658-1870
Tony Rabillard, Manager, Sales
trabillard@amsstorage.com, 800-466-0813

Advanced Media Services designs, manufactures and supports network attached storage and CD/DVD server appliances that provide superior price/performance, high reliability and ease of installation, management and use. *(SD/S)*

Advanced Storage Array Products
1771 International Pkwy., Suite 129
Richardson, TX 75081
972-783-1000
www.asapit.com

Aeon Communications Ltd.
Aeon House, Acorn Business Centre, Ling Rd.
Poole, Dorset, BH12 4LZ, England
01202 738738
www.aeon.co.uk

Agilent Technologies
Inventing the HP Way

Agilent Technologies
1101 Creekside Ridge Dr., Suite 100
Mailstop RH-20
Roseville, CA 95661
916-788-5440
www.semiconductor.agilent.com

Bob Whitson, Manager, SAN Marketing
bob_whitson@agilent.com
Bryan Cowger, Manager, Tachyon IC
bryan_cowger@agilent.com
Collins Linger, Manager, SPG Sales & Marketing
collins_linger@agilent.com

Agilent provides the most extensive range of high performance, interoperable Fiber Channel solutions. This includes protocol and physical-layer ICs, fiber optic tranceivers and host bus adapters (HBAs) with supporting driver software. *(SD/S)*

Alidian Networks
145 Baytech Dr.
San Jose, CA 95134
408-273-4700
www.alidian.com

Amacom Technologies Inc.
1796 Technology Dr.
San Jose, CA 95110
408-501-0325
www.amacom-tech.com

AMDAHL
a Fujitsu company

Amdahl Corporation
1250 E. Arques Ave.
Sunnyvale, CA 94088
408-746-6000
www.amdahl.com

Richard McCormack, Vice President, Storage Marketing
richard_mccormack@amdahl.com, 408-746-3485
Wayne Giroux, Storage Strategist
WQG30@amdahl.com, 408-746-7108
Gerald Conboy, Vice President/General Manager, Worldwide Sales
gerald_conboy@amdahl.com, 212-820-1524

Amdahl offers advanced storage solutions for all IT environments to help corporations meet challenges such as e-business, CRM, and data warehousing. Our superior solutions include hardware, software, and professional services. *(SD/S,SNI,DM,SRM, S)*

American Power Conversion
132 Fairgrounds Rd.
W. Kingston, RI 02892
401-789-5735
www.apcc.com

Ancor Communications
361 Bury Dr.
Eden Prairie, MN 55346
612-932-4071
www.ancor.com

Ancot
115 Constitution Dr.
Menlo Park, CA 94025
650-322-5322
www.ancot.com

Applianceware
50 Airport Pkwy., Suite 207
San Jose, CA 95110
510-580-5155
www.applianceware.com

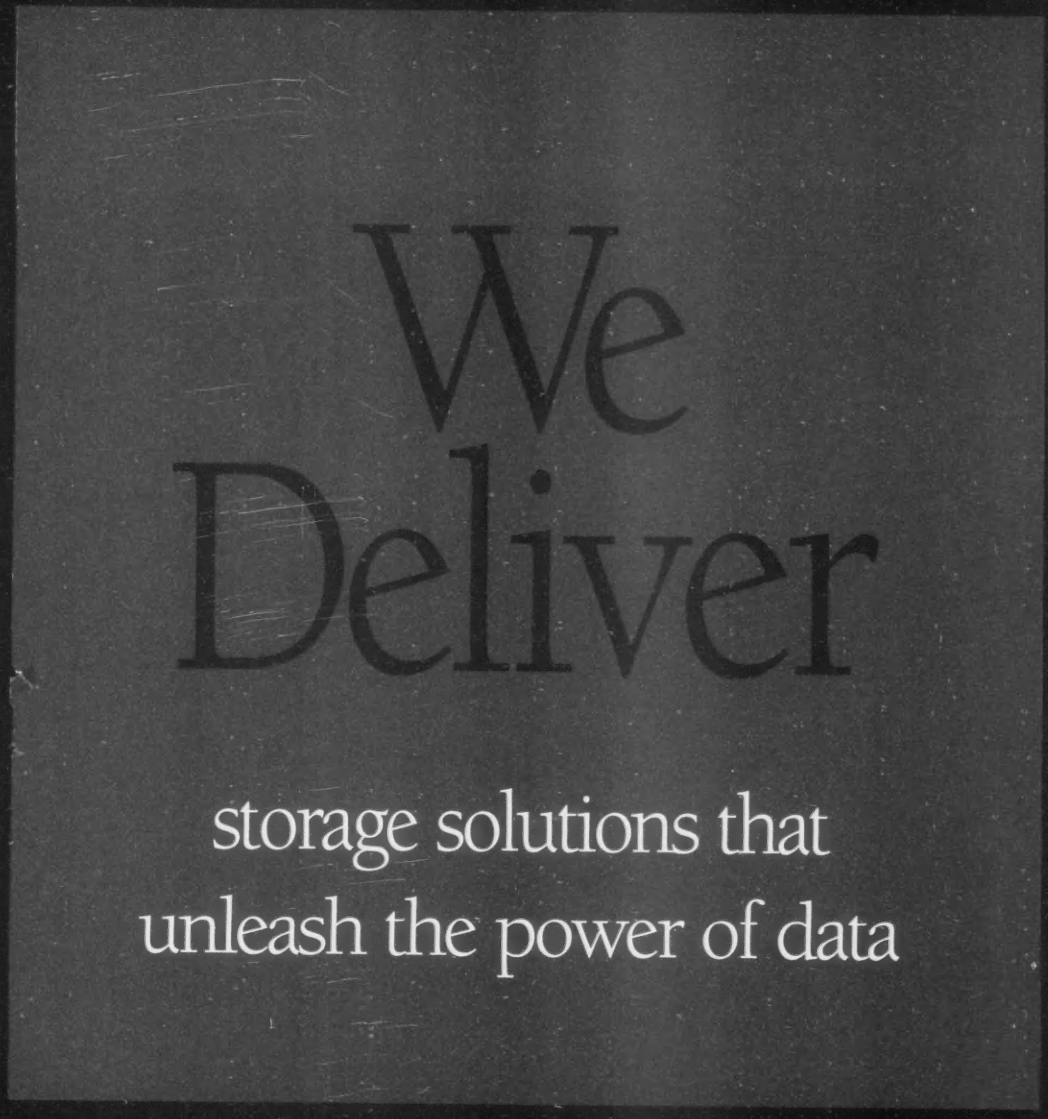
Arch Data Systems Inc.
27 Central St.
P.O. Box 7183
Lowell, MA 01852
987-452-3436
www.dvd-storage.com

Archion
4235 Maryellen Ave., Suite 302
Studio City, CA 91604
818-655-2222
www.archion.com

ATL Products Inc.
101 Innovation Dr.
Irvine, CA 92612
949-477-7800
www.atlp.com

Atto Technology
155 Crosspoint Pkwy.
Amherst, NY 14068
716-691-1999
www.attotech.com

Auspex Systems
2800 Scott Blvd.
Santa Clara, CA 95050
408-566-2000
www.auspex.com



www.amdahl.com/storage

AMDAHL

a Fujitsu company

© 2000 Amdahl Corporation. All rights reserved.

Availant
215 First St.
Cambridge, MA 02142
617-621-2542
www.availant.com

Avantis Inc.
325 E. Hillcrest Dr., Suite 250
Thousand Oaks, CA 91360
888-222-1945
www.avantis.co.uk

Backup Works
3621 MacArthur Blvd., Suite 107
Santa Ana, CA 92704
714-751-2636
www.backupworks.com

BakBone Software
10145 Pacific Heights Blvd., 9th Floor
San Diego, CA 92121
877-949-2663
www.bakbone.com

BiTMICRO Networks Inc.
45550 Northport Loop E.
Fremont, CA 94538
510-623-2341
www.bitmicro.com

BMC Software
2101 CityWest Blvd.
Houston, TX 77042
800-841-2031
www.bmc.com/products/esm

Deborah Jagoe, Product Marketing, Storage
deborah_jagoe@bmc.com, 770-602-1423
Tony Sanders, Product Marketing Manager, Storage
tony_sanders@bmc.com, 678-443-8243
Beverly Casstevens, Field Marketing, Storage
beverly_casstevens@bmc.com, 678-443-8313

Storage Management solutions from BMC Software assess your total enterprise storage environment. As part of BMC Software's solutions to guarantee e-availability, storage disciplines are integrated with application management approaches to ensure availability of key business processes. *(SD/S,SNI,DM,SRM,OSMS)*

Broadcom Corporation
16215 Alton Pkwy.
P.O. Box 57013
Irvine, CA 92618
949-450-8700
www.broadcom.com

Brocade Communications Systems Inc.
1901 Guadalupe Pkwy.
San Jose, CA 95131
408-487-8000
www.brocade.com

Jay Kidd, Vice President, Product Marketing
408-487-8000
Charles Smith, Vice President, Worldwide Sales
408-487-8000

BROCADE provides a scalable, reliable foundation for storage environments with its market-leading Fibre Channel Fabric switches, the essential framework for networking servers and storage systems. *(SD/S, SNI, DM,SRM)*

BSDi
4945 N. 30th St., Suite 300
Colorado Springs, CO 80919
719-457-8400
www.bsdi.com

Cambex Corporation
360 Second Ave.
Waltham, MA 02451
781-890-6000
www.cambex.com

CeQuadrat
691 S. Milpitas Blvd.
Milpitas, CA 95035
650-843-3780
www.cequadrat.com

Cereva Networks
100 Locke Dr.
Marlborough, MA 01752
508-486-9660
www.cereva.com

Chaparral Network Storage Inc.
7420 E. Dry Creek Pkwy.
Longmont, CO 80503
303-845-3200
www.chaparralnet.com

Mike Hardy, Vice President, Marketing
303-845-3200
Jerry Walker, Executive Vice President, Operations
Brian Allison, Vice President, Sales
303-845-3200

Chaparral is a premier provider of intelligent storage networking solutions for data-intensive, enterprise applications. Chaparral's Routers and RAID controllers products provide vital connectivity between SCSI and Fibre Channel storage devices. *(SD/S,SNI)*

Chess Archiving Technology
26071 Merit Cir., Suite 108
Laguna Hills, CA 92653
949-348-8250
www.smartdax.com

Ciprico
2800 Campus Dr.
Minneapolis, MN 55441
763-551-4000
www.ciprico.com

Bill Hartman, Vice President, Marketing & Business Development
bhartman@ciprico.com, 763-551-4100
Mike Joseph, Director, Networking Services
mjoseph@ciprico.com, 763-551-4040
Bob Brown, Vice President, Sales
bbrown@ciprico.com, 763-551-4144

Ciprico designs, manufactures and markets high-performance direct-attached and networked storage solutions, including intelligent hardware, software, and professional services. Ciprico storage solutions are designed primarily for visual computing applications. *(SD/S,SNI,DM,SRM,OSM,S)*

Cisco Systems
170 W. Tasman Dr.
San Jose, CA 95134
800-527-4800
www.cisco.com

Cisco AAVID enables the efficient ACCESS of your company's most valuable resource – your information – through storage networking solutions designed for your converged network. *(SNI)*

Citek
1953 N. Main St.
Orange, CA 92865
800-456-2483
www.citek.com

CMD Technology Inc.
9501 Jeronimo Rd.
Irvine, CA 92618
949-454-0800
www.cmd.com

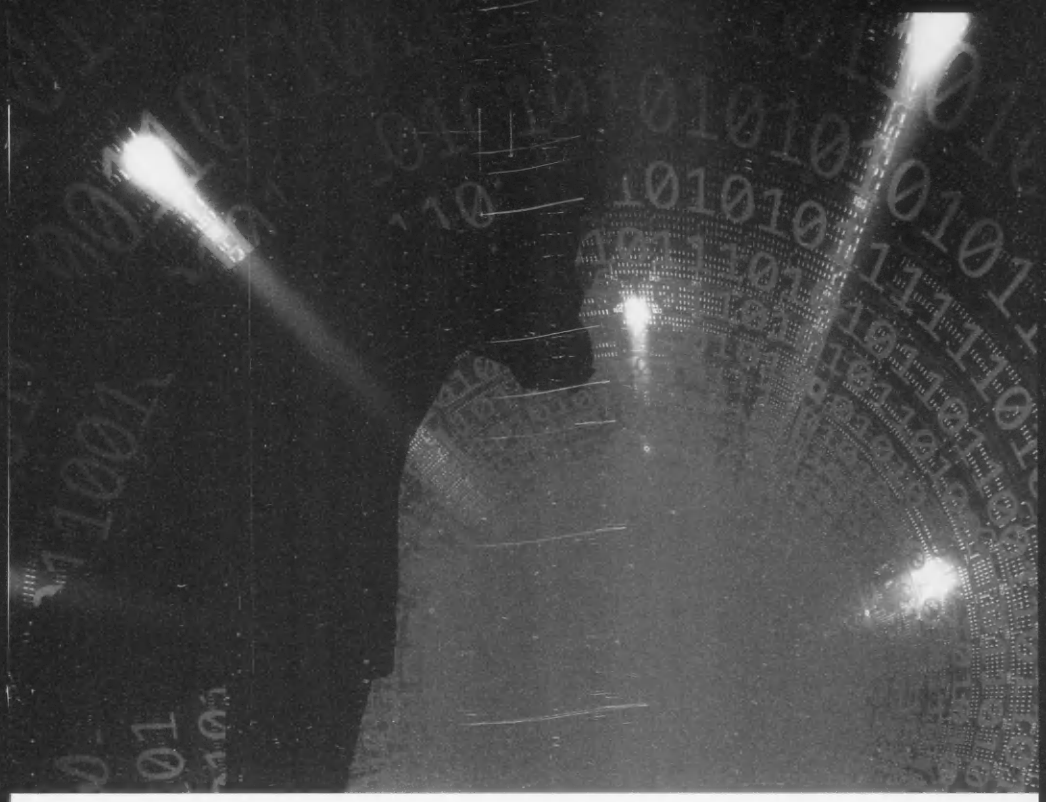
Roger J. Klein, Vice President, Marketing
klein@cmd.com, 949-454-0800
Roger Wang, Chief Technology Officer
wang@cmd.com, 949-454-0800
Dave Guy, Vice President, Sales
guy@cmd.com, 508-668-8380

A worldwide provider of SAN-attach, network-attach, and sever-attach I/O storage solutions. Supplies advanced RAID, storage controller technology and high-performance storage interconnect ASIC (ATA/USB) products to OEMs, VARs, integrators and resellers. *(SD/S)*

CMS Peripherals Inc.
3095 Redhill Ave.
Costa Mesa, CA 92626
714-424-5520
www.cmsproducts.com

Donna Ford, Manager, Marcom
dford@cmsproducts.com, 714-424-5530 x8630
Eric Robinson, Vice President, Engineering
erobinson@cmsproducts.com, 714-424-5520 x5521
Mark Balce, Vice President, Sales
mbalce@cmsproducts.com, 714-424-5520 x5532

CMS is the recognized leader in mass storage products, including notebook & desktop automatic backup devices, hard drive upgrades and data transfer upgrade kits. *(SD/S)*



Don't be mystified by SAN solutions.

The choice is clear.

BROCADE

Combining award-winning Fibre Channel switches and SAN management software, Brocade solutions provide scalability, centralized SAN fabric management, system interoperability, and high performance. Brocade partners with major storage and systems OEMs and Integrators to provide SAN solutions optimized for LAN-free backup, storage and server consolidation, disaster tolerance, and high-availability applications. It's no wonder that Brocade is the industry leader—and the clear choice—for SAN solutions.

Keep up to date with the latest news on SANs. Sign up for our complimentary *Common Threads* newsletter at www.brocade.com today.

©2001 by Brocade Communications Systems, Inc. All rights reserved. Brocade and the Brocade logo are registered trademarks of Brocade Communications Systems, Inc. in the United States and other countries.

CNT
6000 Nathan Ln. N.
Minneapolis, MN 55442
763-268-6000
www.cnt.com

LeAnn R. Castillo, Director, Marketing Communications
leann_castillo@cnt.com, 763-268-6771
Mark Knittel, Senior Vice President, Worldwide Product Operations
mark_knittel@cnt.com, 763-268-6190
Nick Gana, Senior Vice President, Worldwide Sales & Marketing
nick_gana@cnt.com, 508-870-3500

CNT is the global specialist in storage networking solutions. Our technological innovations and consulting services deliver solutions for storage infrastructures, like SANs, that span the enterprise. *(SN|,S)*

Columbia Data Products Inc.
1070-B Rainer Dr.
P.O.Box 163088
Altamonte Springs, FL 32714
407-869-6700
www.cdp.com

CommVault Systems
2 Crescent Pl.
Oceanport, NJ 07757
732-870-4000
www.commvault.com

Larry Cormier, Vice President, Marketing & Business Development
lcormier@commvault.com, 732-870-4000
Brian McAteer, Vice President, Sales
bmcateer@commvault.com, 732-870-4000

The company's singular focus is creating and implementing fast, reliable, and easy-to-use storage management software solutions to meet customer's data management requirements. The company's software products seamlessly ensure the reliable, rapid restoration of files, business-critical applications, and today's most popular databases. *(DM,SRM,OSM,S)*

Compaq Computer Corporation
20555 SH 249
Houston, TX 77070
281-370-0670
www.compaq.com

Peter Delle Donne, Vice President, Storage Products
peter.delledonne@compaq.com, 508-841-7124
Brad Harwell, Manager, Product Marketing
brad.harwell@compaq.com, 281-927-1642
Mike Good, Manager, Field Sales
mike.good@compaq.com, 508-841-3980

Our solutions help customers implement enterprise storage based on StorageWorks and SANworks solutions; Storage on Demand; implementation of a private utility and buying storage as a service over a network from a storage service provider (SSP). *(SD/S,SN|,DM,SRM,OSM,S)*

Compsat Technology
25330 Telegraph Rd., Suite 200
Raleigh Officentre
Southfield, MI 48034
248-223-1020
www.compsat.com

Computer Associates International Inc.
One Computer Associates Plaza
Islandia, NY 11749
631-342-6000
www.cai.com

Phillip Goodwin, Brand Manager, Storage
phillip.goodwin@cai.com, 303-410-7500
Michael Ragusa Senior Vice President, Sales
michael.ragusa@cai.com, 631-342-6000
Chin Kuo, Senior Vice President, Development
chin.kuo@cai.com, 631-342-6000

Computer Associates provides enterprise storage solutions that improve our customer's data protection, management and availability. Computer Associates is the worldwide leader for storage management software (all platforms) with the largest market share of 31% ($2.8B market) according to IDC. *(DM,SRM)*

Computer Data Strategies Inc.
P.O. Box 25123
Woodbury, MN 55125
651-730-4156
www.cds-inc.com

Computer Network Technology
6000 Nathan Ln. N.
Minneapolis, MN 55442
800-268-0090
www.cnt.com

Computerm
111 Wood St.
Pittsburgh, PA 15222
412-391-7804
www.computerm.com

Connex Inc.
2040 Fortune Dr., Suite 200
San Jose, CA 95131
408-232-9701
www.connex.com

Bob Wilson, Vice President, Marketing
bwilson@connex.com, 408-232-9701
Robert Wright, Vice President, SAN Software Engineering
rwright@connex.com, 408-232-9701
Don Purkey, Vice President, Sales
dpurkey@connex.com, 408-232-9701

Connex offers storage systems that are simple to implement and manage while allowing for future expansion using Network Attached Storage (NAS); Storage Area Network (SAN); enterprise, server and storage management; and Fibre Channel solutions. *(SD/S,SN|,SRM,OSM)*

Cranel Inc.
8999 Gemini Pkwy.
Columbus, OH 43240
800-288-3475
www.cranel.com

Creekpath Systems
1685 38th St.
Boulder, CO 80301
877-692-7335
www.creekpath.com

Crossroads Systems
9390 Research Blvd., Suite 11-300
Austin, TX 78759
512-928-7532
www.crossroads.com

CrosStor Software Inc.
4041 Hadley Rd.
S. Plainfield, NJ 07080
908-226-0100
www.crosstor.com

Sue Smith, Director, Marketing
sue@crosstor.com, 908-226-0100, x131
Gordon Harris, Chief Technology Officer
harris@crosstor.com, 908-226-0100, x102
Jeff Holthall, Vice President, Sales & Marketing
908-226-0100, x105

CrosStor NAS is a programmable OS for network-attached storage (NAS) appliances enabling OEMs to develop high-performance, feature-rich, multi-protocol file servers for both Unix and Microsoft Windows clients. CrosStor SAN offers Microsoft CIFS and Unix file sharing and other valuable interfaces. *(SD/S,SN|,DM,SRM,OSM)*

Curtis Inc.
2155 Niagara Ln. N., Suite 108
Minneapolis, MN 55447
612-404-9081
www.mncurtis.com

CuttingEdge Systems Inc.
6191 Center St.
La Mesa, CA 91942
619-667-7888
www.cuttedge.com

Cybernetics
111 Cybernetics Way
Yorktown, VA 23693
757-833-9990
www.cybernetics.com

CYGNET Storage Solutions Inc.
1745 McCandless Dr.
Milpitas, CA 95035
408-954-1800
www.elms.com

Data Storage Depot
233 Greenwood Ave.
Bethel, CT 06801
203-791-9511
www.datastoragedepot.com

Data Think
5551 Sunshine Canyon Dr.
Boulder, CO 80302
303-448-0420
www.datathink.com

DataCore Software Corporation
6261 N.W. 6th Way #110
Fort Lauderdale, FL 33309
954-267-1620
www.datacoresoftware.com

Augie Gonzalez, Director, Product Marketing
augie.gonzalez@datacoresoftware.com, 954-267-1620
Tom Conrad, Vice President, Sales
tom.conrad@datacoresoftware.com, 954-267-1620

DataCore Software Corporation is an innovator in storage networking software. DataCore's SANsymphony software helps companies manage storage in highly fragmented and proprietary environments. *(SN|,SRM,S)*

Look Ma, No Server.

New ARCserve® 2000 Offers Serverless Backup And Restore Plus Hundreds Of Other Enhancements.

It couldn't have come at a better time. With eBusiness storage needs typically doubling every 18 months, and the growing demand for 100% uptime and availability of servers, IT administrators are facing ever-greater challenges.

New ARCserve 2000 is the answer. With serverless backup and restore, ARCserve 2000 represents a major breakthrough in data storage. With SAN, there are many new industry-leading capabilities like shared tape libraries and high-speed data transfer.

ARCserve 2000 leverages industry standards for assured compatibility with high performance, ease-of-use, and unprecedented value. Just a few of the reasons why new ARCserve 2000 is the best storage solution for the eBusiness revolution.

Visit www.ca.com/arcserve for more information.

COMPUTER® ASSOCIATES
Software superior by design.

New ARCserve® 2000

© 2000 Computer Associates International, Inc., Islandia, NY 11749. All trademarks, trade names, service marks, and logos referenced herein belong to their respective companies.

DataDirect Networks Inc.
9201 Oakdale Ave.
Chatsworth, CA 91311
818-700-7600
www.datadirectnet.com

Robert Woolery, Vice President, Corporate Development & Strategic Planning
rwoolery@datadirectnet.com, 818-700-7650
Bob Farkaly, Vice President, OEM Sales & Marketing
bfarkaly@datadirectnet.com, 818-700-7600

Storage Area Networking appliance leader DataDirect Networks provides Rich-Media communities with high-bandwidth, virtualized, scalable and flexible network infrastructures, reducing TCO, enabling higher productivity with increased ROI. *(SNI,DM)*

Datalink Corporation
7423 Washington Ave. S.
Minneapolis, MN 55439
800-448-6314
www.datalink.com

Datalink is the nation's leading independent architect of enterprise-class information storage infrastructures. Datalink designs, builds, and supports information storage architectures that ensure information availability, storage and protection. *(S/DS,SNI,DM,SRM,S)*

Datastor
195-201 Willis St.
Wellington, New Zealand
64 9 415 6220
www.datastor.co.nz

DataZONE Corporation
6276 San Ignacio Ave.
San Jose, CA 95119
408-360-8688
www.datazonecorp.com

DBMS Resources Inc.
477 E. Butterfield Rd., Suite 20
Lombard, IL 60148
630-964-1800
www.dbms.com

Dell Computer Corporation
One Dell Way
Round Rock, TX 78682
800-274-3355
www.dell.com

PowerVault storage products are designed to drive high-end storage features into standard computing environments, meeting a wide range of customer storage needs. Dell offers a variety of award-winning services such as factory installation of proprietary hardware and software; leasing and system installation; warranty coverage; and user support. *(SD/S,SNI,SRM,OSM,S)*

Digi-Data Corporation
8580 Dorsey Run Rd.
Jessup, MD 20794
301-498-0200
www.digidata.com

Digital Storage Inc.
7611 Green Meadows Dr.
Lewis Center, OH 43035
800-232-3475
www.digitalstorage.com

Disc Inc.
372 Turquoise St.
Milpitas, CA 95035
408-934-7000
www.discjuke.com

Discreet
10 Duke St.
Montreal, Quebec, H3C 2L7, Canada
514-393-1616
www2.discreet.com

DLTtape™
500 McCarthy Blvd.
Milpitas, CA 95035
408-894-4000
www.dlttape.com

Bill Boles, Vice President/General Manager, Group Marketing
william.boles@quantum.com, 408-894-4000
Philip Treide, Manager, Super DLTtape Product Marketing
philip.treide@quantum.com, 508-770-3111

DLTtape™ technology is the data protection solution of choice and the proven industry standard. It is supported by a universe of data storage solutions, which guarantee compatibility across all platforms, hardware sytems, and software applications. *(SD/S,DM,SRM,OSM)*

Dot Hill Systems
6305 El Camino Real
Carlsbad, CA 92009
800-872-2783
www.dothill.com

DTC Data Technology
1222 Alderwood Dr.
Sunnyvale, CA 94086
408-745-9320
www.datatechnology.com

ECCS Inc.
1 Sheila Dr.
Tinton Falls, NJ 07724
732-747-6995
www.eccs.com

Ecrix Corporation
5525 Central Ave.
Boulder, CO 80303
303-402-9262
www.ecrix.com

eDataGroup
Level 1, 12 Ashley St.
Chatswood NSW 206, Australia
61 2 9882 1141
www.edatagroup.com

Electronic Data Systems
5400 Legacy Dr.
Plano, TX 75024
972-604-6000
www.eds.com

EMC
35 Parkwood Dr.
Hopkinton, MA 01748
508-435-1000
www.emc.com

Michael A. Ruffolo, Executive Vice President, Global Sales, Services & Marketing
508-435-1000

At EMC, we build the world's most robust, secure and trusted information storage infrastructures. Our storage systems, software, networks and services ensure fast, round-the-clock access to all of the information businesses and individuals must have to prosper in the Information Economy. To EMC's customers, EMC is the caretaker of the world's information. *(SD/S,SNI,DM,SRM,OSM,S)*

Emphora
4 Independence Way
Princeton, NJ 08540
609-919-4050
www.emphora.net

Matthew Kamp, Business Manager
mkamp@emphora.net, 609-919-4050
James Philbin, Chief Executive Officer/Chief Technology Officer
jphilbin@emphora.net, 609-951-2749

Emphora delivers intelligent storage solutions and storage application servers for the information utility industry. Emphora's block I/O Storage System and DB Servers provide RAS, security, and scalability at an outstanding price-performance ratio. Available Q1, 2001, visit www.emphora.net for more information. *(SD/S,SNI)*

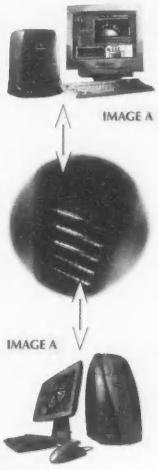
Emulex Corporation
3535 Harbor Blvd.
Costa Mesa, CA 92626
800-854-7112
www.emulex.com

Mike Smith, Vice President, Worldwide Marketing
mike.smith@emulex.com, 714-662-5600
Ron Qualiara, Senior Vice President, Technology
ron.qualiara@emulex.com, 714-662-5600
Kirk Roller, Senior Vice President, Worldwide Sales & Marketing
kirk.roller@emulex.com, 714-662-5600

Emulex Corporation manufactures fibre channel host bus adapters and digital retiming hubs. Emulex's LightPulse family of products support all fibre channel standards, including arbitrated loop, switched fabric and point-to-point topologies. *(SNI,DM)*

what are you waiting for?

Don't wait for unnecessary data transfers: Share your files with a SAN solution from Ciprico.



Time is money, especially for companies like yours that depend on **visual image computing**. Don't waste either one with inefficient, unnecessary file transfers.

Now you can maximize production time. Speed your operation's workflow. And increase your revenue potential with Ciprico's totally **integrated SAN solutions**.

Ciprico offers a **superior** line of open storage solutions that are fast, reliable, and easy to install. Our products are designed for **direct attached** and **networked environments**.

You want it, we got it:

- **7000** Series Disk Array for high bandwidth, single stream applications
- **FibreSTORE** Family of Storage Systems for high bandwidth, multistream applications
- **NETarray** Storage Systems for high I/O applications

Visit our web site at **www.ciprico.com** to see how we help visual imaging companies maximize their capabilities by **streamlining project workflow**. Or call 1.800.727.4669

CIPRICO

Protecting your image

Ciprico Inc. Headquarters:
2800 Campus Drive, Plymouth, Minnesota 55441 ▪ 763.551.4000 ▪ Fax: 763.551.4002
Ciprico International, Ltd.: United Kingdom ▪ Singapore ▪ Tokyo

eRedi Inc.
4800 Whitesburg Dr., Suite 30-301
Huntsville, AL 35802
256-650-5315
www.eredi.com

E-Stor
17100 S. Halsted
Harvey, IL 60426
877-378-6763
www.e-stor.com

Eurologic Systems
1300 Massachusetts Ave.
Boxborough, MA 01719
978-266-9224
www.eurologic.com

Evaluator Group Inc.
7720 E. Belleview Ave., Suite 210
Englewood, CO 80111
303-221-7867
www.evaluatorgroup.com

Jack Scot, Managing Partner
jack@evaluatorgroup.com, 303-221-7867
Chuck Standerfer, Senior Partner
chuck@evaluatorgroup.com, 303-221-7867
Dick Bannister, Partner
dick@evaluatorgroup.com, 303-221-7867

We offer a subscription service to a web accessible database on storage, SANs, NAS and storage software. We also conduct related seminars and sell detailed technical product publications. *(S)*

Evergreen Continuity Data Inc.
28 Green St.
Newbury, MA 01951
978-499-7700
www.evergreen-data.com

Exabyte Corporation
1685 38th St.
Boulder, CO 80301
800-EXABYTE
www.exabyte.com

Engineered to work seamlessly with SAN components from other companies, Exabyte tape libraries are scalable and SAN-ready, with features such as optional Ethernet ports, hot-pluggable drives and native Fibre Channel. *(SD/S)*

Excel/Meridian Data Inc.
3330 Earhart Dr., #212
Carrollton, TX 75006
800-995-1014
www.excelcdrom.com

Paul Kledgen, Vice President, Marketing
prk@excelcdrom.com, 972-980-7098
Paul Weathers, Vice President, Production & Support
pweathers@excelcdrom.com, 972-980-7098
Lauren Lueders, Vice President, Sales
lauren@excelcdrom.com, 972-980-7098

Excel/Meridian Data Inc. specializes in custom design Network Attached Storage devices, including CD-ROM Towers, Servers, Jukeboxes, RAID Arrays and NAS (Network Attached Storage) solutions. *(SD/S,SNI)*

e-zdata.net
1301 Dove St., Suite 1070
Newport Beach, CA 92660
800-337-4185
www.e-zdata.net

FiComp Inc.
2720 S. Croddy Way
Santa Ana, CA 92704
714-546-0235
www.ficompinc.com

Filelink Corporation
7900 International Dr., Suite 675
Bloomington, MN 55425
877-FILELINK
www.filelink.com

FileReserve.com
1314 W. Alabama #3
Houston, TX 77098
713-218-7847
www.filereserve.com

Filetek Inc.
9400 Key West Ave.
Rockville, MD 20850
301-251-0600
www.filetek.com

Finisar
1308 Moffett Park Dr.
Sunnyvale, CA 94089
408-548-1000
www.finisar.com

Flexstar Technology
47323 Warm Springs Blvd.
Fremont, CA 94539
510-440-0170
www.flexstar.com

Fortel
46832 Lakeview Blvd.
Fremont, CA 94538
510-440-9600
www.fortel.com

Fujitsu Computer Products
2904 Orchard Pkwy.
San Jose, CA 95134
800-626-4686
www.fcpa.com

FuturePlus Systems Corporation
2790 N. Academy Blvd., #307
Colorado Springs, CO 80917
719-380-7321
www.futureplus.com

Gadzoox Networks
5850 Hellyer Ave.
San Jose, CA 95138
408-360-4950
www.gadzoox.com

Clark Foy, Vice President, Marketing
cfoy@gadzoox.com, 408-360-6027
Joel Warford, Senior Director, Product Marketing
jwarford@gadzoox.com, 408-361-6130
Kent Bridges, Vice President, Sales
kbridges@gadzoox.com, 408-360-6001

Gadzoox Networks is a leader in SAN (storage area network) products. The Company provides networking solutions for enterprise storage with scalable, managed SAN solutions based on Gadzoox Fibre Channel switches, routers, storage pooling, hubs and management systems. *(SNI)*

GENROCO Inc.
255 Info Hwy.
Slinger, WI 53086
262-644-8700
www.genroco.com

Donald D. Woelz, Vice President, Marketing
don@genroco.com, 262-644-8700
Don Benson, Vice President, Sales
donb@genroco.com, 262 644-8700

GENROCO Inc. is the premier supplier of ultra high performance system and storage area network components for workstations and superservers, including Compaq, Fujitsu, IBM, Silicon Graphics, Sun, and other platforms. Along with custom offerings, the 25-year-old firm produces high bandwidth Gigabyte System Network, Fibre Channel, Gigabit Ethernet, and HIPPI host bus adapters, routers, bridges, and switches. *(SD/S,SNI)*

Giga Trend Inc.
5845 Owens Ave.
Carlsbad, CA 92008
760-931-9122
www.gigatrend.com

Gigabyte Solutions
15863 Greenway-Hayden Loop #118
Scottsdale, AZ 85260
408-596-7985
www.gigabite.com

Global Data Center Inc.
17831A Sky Park Cir.
Irvine, CA 92614
949-263-0797
www.gdcinc.com

Global Knowledge Group
2700 Earl Rudder Fwy. S., Suite 1300
College Station, TX 77845
979-693-5447
www.gkg-com.com

Glyph Technologies
735 W. Clinton St.
Ithaca, NY 14850
607-275-9464
www.glyphtech.com

Something SUPER

is happening with DLTtape™!

The demand for storage is exploding and the need for fast, reliable storage has never been greater. Today, nearly 75 percent of the midrange tape storage is on DLTtape, the industry standard.

That standard is being extended with Super DLTtape,™ offering dramatically higher storage capacity and faster transfer rates, all with a lower overall cost of ownership.

Learn more about DLTtape and Super DLTtape by calling 1-800-624-5545, or visit us at www.DLTtape.com

Extending the Standard

©2001 Quantum Corporation. All rights reserved. Quantum and the Quantum logo are registered trademarks and DLTtape, Super DLTtape, and the DLTtape logo are trademarks of Quantum Corporation.

GRAU DATA STORAGE

Grau Data Storage Inc.
585 St. Andrews Ln.
Louisville, CO 80027
303-665-3018
www.graudata.com

Mike Holland, President
Mike@GrauData.com, 303-913-6167
Darrell Hanmer, Manager, Area Sales
Darrell@GrauData.com, 909-623-5763

GRAU Data Storage Infinistore/E-Virtual Disk systems offer affordable managed NAS and up to 20TB capacity in a single subsystem. Feature-rich Infinistore sets the standard for ease-of-use and installation. *(SD/S,DM)*

GRESHAM
enterprise storage

Gresham Enterprise Storage
505 E. Huntland Dr., Suite 450
Austin, TX 78752
512-450-0900
www.greshamstorage.com

John McIntosh, Vice President, Sales & Marketing
mcintosh@greshamstorage.com, 303-413-1799
Keith Summers, Product Manager
ksummers@greshamstorage.com, 303-413-1799
Keith Nelson, Director, Sales
knelson@greshamstorage.com, 952-891-2867

Gresham's Enterprise DistribuTAPE allows multiple storage application servers, such as Tivoli Storage Manager, to dynamically share StorageTek Library drives and robots over Storage Area Networks. For more information please visit www.greshamstorage.com. *(DM,SRM,S)*

Hall-Mark Global Solutions
2211 S. 47th St.
Phoenix, AZ 85282
408-794-6500
www.hallmark.avnet.com

Hard Data Ltd.
11060 -166 Ave.
Edmonton, Alberta, T5X 1Y3, Canada
780-456-9771
www.harddata.com

Heroix Corporation
120 Wells Ave.
Newton, MA 02459
617-527-1550
www.heroix.com

Hewlett-Packard
321 E. Evelyn Ave., MS B6
Mountain View, CA 94041
650-694-2170
www.hp.com

Hiarc INC

HIARC Inc.
1240 N. Lakeview Ave., Suite 150
Anaheim, CA 92807
714-970-7511
www.hiarc.com

John Frassel, Director, Marketing
john.frassel@hiarc.com, 714-701-4923
Jon Burgoyne, Vice President
jon.burgoyne@hiarc.com, 765-349-0037
Ron Clevenger, Executive Vice President, Sales
ron.clevenger@hiarc.com; 714-730-0886

HIARC markets self-managing storage management tools to VARs and OEMs. Tools that replicate, mirror, archive and migrate mission-critical data plus restore lost data in real time. Tools designed for server and network appliance devices. *(SNI,DM,SRM,OSM)*

High Velocity Systems
107 Mill Plain Rd.
Danbury, CT 06811
800-334-9001
www.highvelocitysystems.com

HIGHGROUND
STORAGE MANAGEMENT

HighGround Systems Inc.
199 Forest St.
Marlborough, MA 01752
508-460-5152
www.highground.com

Joel Reich, Vice President, Marketing
jreich@highground.com, 508-460-5152
Richard W. Fortier, Vice President, Engineering
rfortier@highground.com, 508-460-5152
Dick Trivata, Vice President, Worldwide Sales
dtrivata@highground.com; 508-460-5152

Storage Resource Manager (SRM) from HighGround Systems is the first and only web-engineered storage infrastructure monitoring, reporting, and event management software; providing storage resource management solutions for the New Enterprise environment. *(SRM)*

HITACHI
DATA SYSTEMS

Hitachi Data Systems
750 Central Expy.
Santa Clara, CA 95050
408-970-1000
www.hds.com

Mimi Howard, Director, Marketing
Mimi.Howard@hds.com, 408-970-7735

Recognized as a leading provider of business solutions for the world's most IT-intensive corporations, Hitachi Data Systems offers a variety of technologies, including world class multi-platform storage and server subsystems. *(SD/S, SNI, DM, SRM, OSM, S)*

I/O Interconnect
1202 E. Wakeham Ave.
Santa Ana, CA 92705
714-564-1111
www.ioint.com

IBM
5600 Cottle Rd.
San Jose, CA 95193
408-256-7567
www.ibm.com

ICP vortex Corporation
4001 E. Broadway Rd., Suite B-20
Phoenix, AZ 85040
602-414-0414
www.icp-vortex.com

AnnDee Johnson, Vice President, Marketing & Sales
a_johnson@icp-vortex.com, 602-414-0414 x14
Frank Poole, Manager, Technical Services
f_poole@icp-vortex.com, 602-414-0414 x22

ICP manufactures PCI-based SCSI and Fibre Channel RAID Controllers, supporting levels 0,1,4, 5 & 10 and Hot-Fix/Hot-Plug/Auto Hot-Plug. ICP provides drivers for NetWare, Windows 9x/NT/2000, Unix, QNX, Linux, BSD and Solaris. *(SD/S)*

Idiom Inc.
200 Fifth Ave., 2nd Floor
Waltham, MA 02451
617-456-3000
www.idiominc.com

IFT Europe Ltd.
9 Magellan Ter.
Crawley, W. Sussex, RH10 2PJ, England
44 1293 400 515
www.infortend.co.uk

imation

Imation Corporation
1 Imation Pl.
Oakdale, MN 55128
888-466-3456
www.imation.com

Imation is a world-leading supplier of branded removable media and professional services for data storage applications from the desktop to the network to the data center. *(SD/S,SRM,S)*

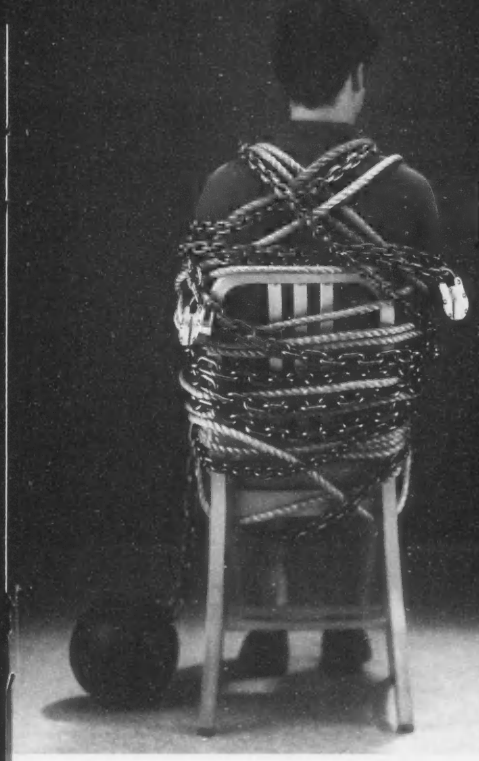
Infineon

Infineon Technologies North America Corporation
1730 N. First St.
San Jose, CA 95112
408-501-6000
www.infineon.com/cnp

Mike Rampelberg, Director, Marketing
mike.rampelberg@infineon.com, 408-501-6562
Jeff Bol, Manager, Technical Marketing
jeff.bol@infineon.com, 303-774-4068
James Fife, Manager, Sales
james.fife@infineon.com, 408-501-6551

From innovative Hard Disk Drive (HDD) and Digital Versatile Disk drive (DVD) to Internet Storage System-On-Silicon solutions, Infineon's Computer & Networking Peripherals (CNP) Division is a partner you can count on. *(SD/S)*

Infinite Solutions
1114 Lost Creek Blvd., Suite 270
Austin, TX 78746
512-306-1433
www.infinitesolutionsinc.com



ARE YOU BEING

held hostage

BY YOUR STORAGE NEEDS?

Presenting SAN.
Storage Area Networks. The Network Behind the Server.

Tired of running around your company collecting backup tapes? Cringe at the thought of how your users react when they can't get to the data they want? Let's face it, with the non-stop growth of data and the increasing need for continuous data availability, your job is not going to get any easier.

Fortunately, there's SAN. By enabling new storage management solutions, like LAN-free backup, SANs can release you from the shackles imposed by the booming growth in data storage.

LAN-free backup provides centralized, multi-server backup that moves backup traffic from the LAN to the SAN to reduce LAN congestion and the effects of backup window downtime. And with Gadzoox SAN products, you'll be set free in no time, since our hubs, switches and routers are certified with all of the major backup applications. With scalability to support gigabytes to terabytes, there's no job too large or small for our SAN solutions.

To learn more about how SANs can help solve your storage management, disaster tolerance and server clustering needs, visit **www.gadzoox.com/backup** or contact Gadzoox sales at 1-888-391-7360. The sooner you do, the sooner you can set your entire organization free.

Gadzoox Capellix 3000 Modular SAN Switch

The Geminix FC-SCSI Router

Gadzoox Capellix 2000 Stackable SAN Switch

COMPUTER ASSOCIATES Software superior by design

VERITAS

LEGATO

gadzoox

©2000 Gadzoox Networks, Inc. All rights reserved. Gadzoox and the Gadzoox logo are trademarks. Capellix and Geminix are trademarks of Gadzoox Networks, Inc.

StorageNetworks and Storage Services for the e-Economy are service marks of StorageNetworks, Inc. All other company, brand and product names contained in this ad may be trademarks or registered trademarks of their respective holders.
StorageNetworks
Storage Services for the e-Economy
Neither your competition nor new market opportunities will wait for you to add data storage capacity, hire the right people to productively employ that data, or to complete data backup and restore. That's why StorageNetworks℠ provides an on-demand data storage infrastructure, network and software solutions that ensure secure, scalable and accessible data storage, and, of course, the expertise to make it all come together. This way, we save you from the distracting and costly task of storing, protecting and managing your data. In fact, we do this better and more cost-effectively than you ever could yourself. Allowing you to focus on leveraging your information and honing your competitive edge. To learn more about our secure, scalable, "easy-to-access" approach to data storage, visit us at www.STORAGENETWORKS.com.

b
BURKE
BLACKSTONE
BLED DRY
BY DATA STORAGE

Infinity I/O
Box 398
Half Moon Bay, CA 94019
650-712-8975
www.infinityio.com

Dr. Ed Frymoyer, Chief Executive Officer
ed@infinityio.com, 650-712-8975
Guy Mindle, Director, Operations
guy@infinityio.com, 650-712-8975
Jay Kramer, Vice President, Training
jay@infinityio.com, 650-712-8975

Infinity I/O provides Storage Networking education and the industry's first SAN Certification Program to meet all your training requirements and development of best practices in building an effective information infrastructure. *(S)*

InnerVu Corporation
11421 N.E. 120th St.
Kirkland, WA 98034
800-634-8442 x1122
www.innervu.com

INRANGE Technologies Corporation
13000 Midlantic Dr.
Mount Laurel, NJ 08054
856-234-7900
www.inrange.com

Integrated Fibre Technology Ltd.
The Georgian House, Rockshaw Rd.
Merstham, Surrey, RH1 3DB, England
44 0 1737 646161
www.iftraid.com

Integrix Inc.
2001 Corporate Center Dr.
Newbury Park, CA 91320
800-300-8288
www.integrix.com

Interphase Corporation
13800 Senlac
Dallas, TX 75234
214-654-5000
www.iphase.com

Interprocess Systems Inc.
275 Tynebrae Pl.
Roswell, GA 30075
770-645-6100
www.interprocess.com

InterSAN Inc.
5522 Scotts Valley Dr.
Scotts Valley, CA 95066
831-430-0692
www.intersan.net

Intraserver Technologies
7 October Hill Rd.
Holliston, MA 01746
508-429-0425
www.intraserver.com

Intrinsix Corporation
33 Lyman St.
Westboro, MA 01581
508-836-4100
www.intrinsix.com

iomega

Iomega Corporation
1821 W. Iomega Way
Roy, UT 84067
801-332-1000
www.iomega.com

David Campbell, Acting Vice President, Marketing
campbelld@iomega.com, 801-332-3779
Reed Brown, Vice President, Hardware Development
brown@iomega.com, 801-332-4183
Herb Scales, Executive Vice President, Sales
scales@iomega.com, 801-332-3065

Iomega is the leading manufacturer of smart, portable, award-winning storage solutions, including drives and disks. Preferred by millions for sharing, transporting, sorting and backing up their critical information. *(SD/S,SNI,DM,SRM,OSM,S)*

Island Data
2011 Palomar Airport Rd. #300
Carlsbad, CA 92009
760-930-9880
www.islanddata.com

ITIS Services LLC
50 Day St.
Norwalk, CT 06854
203-838-9888
www.itisservices.com

Jems Data Unlimited Inc.
52 Stiles Rd.
Salem, NH 03079
603-896-6319
www.jemsdata.com

JMR Electronics Inc.
20400 Plummer St.
Chatsworth, CA 91311
818-993-4801
www.jmr.com

JNI Corporation
9775 Towne Centre Dr.
San Diego, CA 92121
858-535-3121
www.jni.com

Kintronics
2 Westchester Plaza
P.O. Box 518
Elmsford, NY 10523
800-431-1658
www.kintronics.com

Knowledgetek
7085 W. 119th Pl.
Broomfield, CO 80020
303-465-1800
www.knowledgetek.com

Legacy Storage Systems Corporation
43 Riviera Dr.
Markham, Ontario, L3R 5J6, Canada
905-475-1077
www.legacystorage.com

LEGATO

Legato Systems Inc.
2350 W. El Camino Real
Mountain View, CA 94040
650-210-7000
www.legato.com

Trish Terry, Manager, Corporate Affairs
tterry@legato.com, 925-875-8062

Legato Celestra Power – eliminate the need for a backup window in Oracle database environments! Celestra Power delivers live LAN-free backup in a direct attached storage environment and SANs. *(DM,SRM,S)*

Liberty Systems
120 Saratoga Ave., Suite 82
Santa Clara, CA 95051
408-983-1127
www.libertyinc.com

Lightel Systems Corporation
14016-C Sullyfield Cir.
Chantilly, VA 20151
703-263-0410
www.rcg.com/lightel

LMG

Little Mountain Group
11768 Atwood Rd., Suite 23
Auburn, CA 95603
530-886-0601
www.lmg.com

Graeme Plant, Vice President, Business Development
gplant@lmg.com, 530-886-0601 x33
Mike James, President/Chief Executive Officer
mjames@lmg.com, 530-886-0601 x11

LMG's product line includes verilog Fibre Channel Framer Cores, which support 1/2Gbps point-to-point links and arbitrated loop. These cores are ideal for use in bridges, routers and test equipment. *(SNI)*

LSI Logic
1551 McCarthy Blvd.
Milpitas, CA 95035
800-433-8778
www.lsilogic.com

Mainline Information Systems Inc.
3372 Capital Cir. N.E.
Tallahassee, FL 32308
850-531-0066
www.mainline.com

Managed Storage International
10075 Westmoor Dr.
Westminster, CO 80021
303-661-2681
www.managedstorage.com

Marketex Storage Systems Inc.
1601 Civic Center Dr., Suite 206
Santa Clara, CA 95050
800-426-4381
www.marketex.com

Marshall Industries
Avnet, Inc.
2211 S. 47th St.
Phoenix, AZ 85034
800-877-9839
www.marshall.com

MAXiMAR Data
P.O. Box 596
Pinehurst, NC 28370
877-2MAXIMAR
www.maximardata.com

Maxtor Corporation
510 Cottonwood Dr.
Milpitas, CA 95035
408-432-1700
www.maxtor.com

McDATA Corporation
310 Interlocken Pkwy.
Broomfield, CO 80021
800-545-5773
www.mcdata.com

Mellanox Technologies Ltd.
3333 Bowers Ave., Suite 145
Santa Clara, CA 95054
408-566-0220
www.mellanox.com

Mercury Computer Systems
199 Riverneck Rd.
Chelmsford, MA 01824
978-256-1300
www.mc.com

Meridian Data Inc.
5615 Scotts Valley Dr.
Scotts Valley, CA 95066
831-438-3100
www.meridian-data.com

Meritec
1359 W. Jackson St.
P.O. Box 8003
Painesville, OH 44077
440-354-3148
www.meritec.com

Microcon
432 State Rd., Hwy. 206
Princeton, NJ 08540
609-921-7890
www.microconcad.com

MICROTEST

Microtest Inc.
4747 N. 22nd St.
Phoenix, AZ 85016
800-526-9675
www.microtest.com
Tom McCrystal, (acting) Director, Marketing
tmccrystal@microtest.com, 602-952-6628
Rob Strong, Director, Sales
rstrong@microtest.com, 407-599-9149
Mike Pfeffer, Director, Engineering
mpfeffer@microtest.com, 602-952-6578
Microtest is a leading developer of storage and application appliances that operate exclusively on a Linux operating system with products such as FileZerver, DiscZerver and LinuxZerver. *(SD/S,DM,SRM,OSM)*

MiraLink Corporation
180 S. 300 W., Suite 185
Salt Lake City, UT 84101
801-575-LINK
www.miralink.com

Molex Connector Corporation
2222 Wellington Ct.
Lisle, IL 60532
800-78MOLEX
www.molex.com

COURSE OFFERINGS TAILORED TO

INTEGRATORS	SERVICE AND SUPPORT
END USERS	ENGINEERS
EXECUTIVES	SALES AND MARKETING

LECTURE CLASSES
- OVERVIEW OF SAN AND SAN MANAGEMENT
- FIBRE CHANNEL FOR TECHNICIANS AND ENGINEERS
- FIBRE CHANNEL FOR SALES, MARKETING, AND SUPPORT

LAB MODULES
- SAN HANDS-ON LAB MODULES
- FIBRE CHANNEL ANALYZER AND TROUBLESHOOTING
- SAN BACKUP LECTURE AND LAB

WORKSHOPS
- SAN CASE STUDIES
- SAN CONFIGURATION EXERCISES
- SAN EXECUTIVE MANAGEMENT BRIEFINGS

OUR TRAINING COURSES
- RANGE FROM OVERVIEW TO IN-DEPTH TECHNICAL
- AVAILABLE AS PUBLIC OR IN-HOUSE MODULES
- OFFERED THROUGH TRAINING PARTNERS WORLDWIDE

Infinity I/O is a PRINCIPAL MEMBER of: FCIA SNIA

OPEN SYSTEMS & SOLUTION ORIENTED
SAN TRAINING

Infinity I/O is offering the industry's 1st Open Systems SAN Certification Program, providing clients greater assurance of Fibre Channel and SAN skill sets.

Infinity I/O is the world leader in Fibre Channel & SAN training and is dedicated to being your one-stop shop for all your Storage Networking educational needs, by providing the highest quality courseware available. Since 1995, Infinity I/O has been offering a wide variety of courses designed to educate the marketplace about Storage Networking technology and the successful management of information logistics. The Infinity I/O approach is a systems level training focused on a best practices methodology to building an effective information infrastructure. Rather than offering just one topology, just one protocol or just one company's products, we offer your organization the premier education program in Open Systems, Solution Oriented SAN. We have trained over 7500 Fibre Channel and SAN professionals worldwide.

visit us at **www.infinityio.com** or call us for current course offerings

Infinity I/O

Motorola Computer Group
2900 S. Diablo Way
Tempe, AZ 85282
800-759-1107
www.mcg.mot.com

MTI Technology Corporation
4905 E. La Palma Ave.
Anaheim, CA 92807
800-999-9684
www.mti.com

Peggy Ouamet, Vice President, Marketing
pouamet@mti.com, 714-693-2786
Dan Brown, Chief Technology Officer
dbrown@mti.com, 714-693-2364
Rick Ruskin, Senior Vice President, Sales
rruskin@mti.com, 714-693-2613

MTI provides continuous access to online information through fault-tolerant, cross-platform data storage servers for the enterprise. It develops, manufactures, sells and services data server solutions for Global 2000 companies. *(SD/S,SNI,DM,SRM,OSM,S)*

Mylex, an IBM Company
34551 Ardenwood Blvd.
Fremont, CA 94555
510-796-6100
www.mylex.com

Eric Herzog, Vice President, Marketing
eherzog@us.ibm.com, 510-796-6100
William Prosenik, Vice President, Sales
prosenik@us.ibm.com, 510-796-6100

Mylex, an IBM Company, develops intelligent high-performance Disk Array Controllers and software for moving, storing, protecting and managing data in desktop and networked environments. *(SD/S)*

Myriad Logic
1109 Spring St.
Silver Spring, MD 20910
301-588-1900
www.myriadlogic.com

Myricom Inc.
325 N. Santa Anita Ave.
Arcadia, CA 91006
626-821-5555
www.myricom.com

Netcom Storage
135-080 Samyoung Bldg. 733-24
Yoksam-dong, Kangnam-gu Seoul, Korea
82 2 2186 2800
www.netcomstorage.com

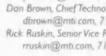
NetConvergence Inc.
3335 Kifer Rd.
Santa Clara, CA 95051
408-737-1808
www.nconvergence.com

Netdrive.com
420 Blossom Hill Rd.
Los Gatos, CA 95032
408-358-1377 x102
www.netdrive.com

Netreon Inc.
386 Main St.
Redwood City, CA 94063
650-569-4400
www.netreon.com

Al Chiang, Director, Marketing
achiang@netreon.com, 650-569-4443
Nick Webb, Director, Marketing
nwebb@netreon.com, 650-569-4421
Kurt Lechner, Director, Sales
klechner@netreon.com, 650-569-4417

Netreon provides SDKs (software developer's kits) to OEMs allowing their devices to participate in directory services and more. Product lines include DirectoryPlus™ for Imaging, Printing, NAS, SAN and Security/authentication for Apache. *(SNI,DM,SRM,S)*



Network Appliance Inc.
495 E. Java Dr.
Sunnyvale, CA 94089
408-822-6000
www.netapp.com

Mark Santora, Senior Vice President, Marketing
Dave Hitz, Vice President, Engineering
Rob Salmon, Vice President, North American Sales

Network Appliance is a leading provider of networked storage solutions that are optimized for doing one thing remarkably well: serve data. Our enterprise solutions work within existing infrastructures to simplify data management and improve network performance.

Network Storage Solutions
5180 Parkstone Dr., Suite 150
Chantilly, VA 20151
703-322-9801
www.nssolutions.com

Nishan Systems Inc.
3850 N. First St.
San Jose, CA 95134
408-435-8390
www.nishansystems.com

Nortel Networks
Dept. 1019, 1 Brunswick Sq., Atrium Suite 100
Saint John, New Brunswick, E2L 4V1, Canada
800-4-NORTEL
www.nortelnetworks.com

Nova Networks Inc.
55 Metcalfe St., Suite 280
Ottawa, Ontario, K1P 6L5, Canada
888-296-6682
www.nova-networks.com

NovaStor Corporation
808 W. Cochran
Simi Valley, CA 93065
805-579-6700
www.novastor.com

Novell
122 E. 1700 S.
Provo, UT 84606
888-321-4272
www.novell.com

NSM Storage Inc.
275 C. Marcus Blvd.
Hauppage, NY 11788
631-273-4600
www.nsmjukebox.com

nStor
10141 Mesa Rim Rd.
San Diego, CA 92121
858-453-9191
www.nstor.com

Oak Technology
139 Kifer Ct.
Sunnyvale, CA 94086
408-737-0888
www.oaktech.com

OnStream Inc.
1951 S. Fordham St.
Longmont, CO 80503
303-772-9000
www.onstream.com

Kim Sparks, Director, MarCom & Channel Marketing
kim.sparks@onstream.com, 303-772-9000
Jim Jonez, Vice President, Worldwide Marketing
jim.jonez@onstream.com, 303-772-9000
Paul Griffin, Vice President, Worldwide Sales
paul.griffin@onstream.com, 303-772-9000

OnStream offers high-capacity tape drives for entry-level server and desktop computing environments. OnStream drives are powered by ADR – a new technology delivering high performance and reliability at an affordable price. *(SD/S)*

Open Storage Solutions
3908 Wiltshire Rd.
Moreland Hill, OH 44022
440-893-9944
www.openstore.com

Overland Data Inc.
8975 Balboa Ave.
San Diego, CA 92123
800-729-8725
www.overlanddata.com

OTG Software Inc.
6701 Democracy Blvd., 8th Floor
Bethesda, MD 20817
301-897-1400
www.otg.com

Ameno Ali, Senior Vice President, Marketing & Strategy
aali@otg.com, 301-897-1400
Grant Wagner, Senior Vice President, Worldwide Sales
gwagner@otg.com, 301-897-1400

OTG delivers the most comprehensive online data storage and access solutions on the market. Our Xtender suite provides businesses with continuous, real-time access to unlimited quantities of data over the Web, Storage Area Networks, and Local Area Networks. *(OSM)*

Panasas LLC
4616 Henry St.
Pittsburgh, PA 15213
412-687-9910
www.panasas.com

Paragon Data Systems Inc.
600 W. Fulton St., Suite 302
Chicago, IL 60661
312-893-8600
www.paragonds.com

Pathlight Technology Inc.
9 Brown Rd.
Ithaca, NY 14850
607-266-4000
www.pathlight.com

Phoenix International
812 W. Southern Ave.
Orange, CA 92865
714-283-4800
www.phenxint.com

Picolight Inc.
4665 Nautilus Ct. S., Suite 3
Boulder, CO 80301
303-530-3189
www.picolight.com

PIRUS

Pirus Networks
43 Nagog Park
Acton, MA 01720
978-206-9100
www.pirus.com

Mark Lovington, Vice President
mlovington@pirus.com, 978-206-9100
Doug Wood, Vice President, Engineering
dwood@pirus.com, 978-206-9100
Thomas Dionne, Director, Business Development & Sales
tdionne@pirus.com, 978-206-9100

Pirus is creating a new generation of networking products that combine both IP and storage networking. This new generation of products will significantly change the landscape of data storage networking by providing more extensible, interoperable, secure and manageable SANs for service providers and large enterprises. *(SNI)*

Plasmon IDE
9625 W. 76th St.
Eden Prairie, MN 55344
952-946-4100
www.plasmon.com

Postech
2646 Richardson St.
Madison, WI 53711
608-271-0658
www.postech.com

PowerQuest
P.O. Box 1911
Orem, UT 84059
801-437-8900
www.powerquest.com

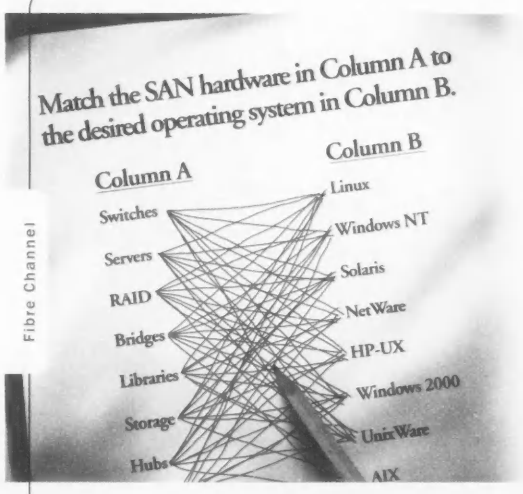
Prisa NETWORKS

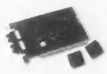
Prisa Networks
6620 Mesa Ridge Rd., Suite 200
San Diego, CA 92121
858-677-0362
www.prisa.com

Ted Chen, Executive Vice President
tedc@prisa.com, 858-677-0362 x133
Don Deel, Chief Technology Officer
don@prisa.com, 858-677-0362 x108
Bill Leonard, Vice President, Sales
bill@prisa.com, 805-382-2902

Prisa Networks provides network management software for Storage Area Networks (SANs), including modules for service level management, performance management, and configuration management. Customers include OEMs and major systems integrators. *(SNI,DM,SRM,OSM)*

ProactiveNet
2150 Gold St., Silicon Valley
Alviso, CA 95002
408-935-6800
www.proactivenet.com





Need to ensure SAN interoperability?
With QLogic, there are no wrong answers.

Choose the Fibre Channel adapters proven to interoperate throughout the SAN. Today's heterogeneous SAN environments demand interoperability. QLogic's Fibre Channel products are designed to perform harmoniously with a broad range of software and hardware. Interoperability is engineered into QLogic's unique single chip solution and ultra-scalable architecture, making QLogic's Fibre Channel solutions the easiest to implement and evolve. Install a QLogic board and it works. It's not magic – just the result of years of exacting design and diligent testing. It's why QLogic sells more Fibre Channel adapters than anyone in the industry and what will put your mind at ease.

qlogic Corp. **The Connection is Critical.**
www.qlogic.com NASDAQ: QLGC

The Connection is Critical.

©2000 QLogic Corporation. All rights reserved. All trademarks and registered trademarks are the property of their respective holders.

ProDisk Inc.
5637 Memorial Ave.
N. Stillwater, MN 55082
651-439-6202
www.prodiskinc.com

Prostor Inc.
10175 Barbur Blvd., Suite 116
Portland, OR 97219
503-245-7974
www.prostorinc.com

Qlogic
26650 Laguna Hills Dr.
Aliso Viejo, CA 92656
949-389-6000
www.qlogic.com

Larry Fortmuller, Vice President, Corporate Marketing
l_fortmuller@qlc.com, 949-389-6000
Mark Spawart, Vice President, Sales
m_spawart@qlc.com, 949-389-6000
Jerry Ahston, Vice President, Engineering
j_ahston@qlc.com, 949-389-6000

QLogic is a leading designer and supplier of SAN infrastructure components in the industry. The company delivers a full range of Fibre Channel switches, PCI host bus adapters, controller silicon and management chips for systems and peripherals. *(SN)*

Quadratec
120120 Sunrise Valley Dr., Suite 100
Reston, VA 20191
703-391-7707
www.quadratec-software.com

Quad Research
5 Whatney
Irvine, CA 92618
949-864-4000
www.quadresearch.com

Quantum
2001 Logic Dr.
San Jose, CA 95124
408-232-6831
www.quantum.com

QUALSTAR Corporation
6709 Independence Ave.
Canoga Park, CA 91303
818-592-0061
www.qualstar.com

Radiant Software
3000 Olympic Blvd., Suite 2510
Santa Monica, CA 90404
818-386-0403
www.radiantsw.com

RAIDION Systems Inc.
7580 Quattro Dr.
Chanhassen, MN 55317
800-875-0068
www.ptgs.com

Raidtec
CORPORATION

Raidtec Corporation
1324 Union Hill Rd., Building A
Alpharetta, GA 30004
770-664-6066
www.Raidtec.com

Bill Bedford, Vice President, Marketing
bedford@raidtec.com, 770-664-6066
John Caravello, Vice President, Sales
johncaravello@raidtec.com, 770-664-6066

Raidtec Corporation is a leading designer and manufacturer of Network Attached Storage software and hardware solutions, Storage Area Network, and RAID products. *(SD/S)*

Raltron Electronics Corporation
10651 N.W. 19th St.
Miami, FL 33172
305-593-6033
www.raltron.com

Rancho Technology Inc.
10783 Bell Court Ranch
Cucamonga, CA 91730
909-987-3966
www.rancho.com

Recovery Solutions Inc.
21 Terry Ave.
Burlington, MA 01803
800-RSI-0235 x130
www.electronicvaulting.com

Reel Emulation
1725 Carpenter-Fletcher Rd., Suite 307
Durham, NC 27713
919-484-8404
www.reel-emulation.com

Rising Edge Technologies
1110 Elden St., Suite 301
Herndon, VA 20170
703-471-8108
www.rising-edge.com

Roberts Data International Inc.
P.O. Box 18708
Atlanta, GA 31126
404-365-0181
www.StorageAndBackup.com

Ross Alexander, Marketing & Sales
Ross@StorageAndBackup.com, 404-365-0692
Wes Eugene, Vice President, Sales
Wes@StorageAndBackup.com

We offer storage and backup network systems along with installation, training and support to SAN and network attached users. *(SD/S,SN,DM,SRM,OSM,S)*

Rock Solid Systems Inc.
47428 Fremont Blvd.
Fremont, CA 94538
510-656-0285
www.rssinc.com

RocketChips Inc.
7901 Xerxes Ave. S., Suite 316
Minneapolis, MN 55431
952-948-0000
www.rocketchips.com

Sagitta Performance Systems
208 Highmeadow Dr.
Gahanna, OH 43230
614-337-2033
www.sagitta-ps.com

SAN Valley Systems
2105 S. Bacom Ave., Suite 195
Campbell, CA 95008
408-559-6888
www.sanvalley.com

SanCastle Technologies
2107 N. First St., Suite 500
San Jose, CA 95132
408-573-4200
www.sancastle.com

SanDisk
140 Caspian Ct.
Sunnyvale, CA 94089
408-542-0500
www.sandisk.com

SanGate Systems
144 Turnpike Rd.
Southborough, MA 01770
508-490-7900
www.sangate.com

sanone

SanOne
26 W. Lone Cactus Dr.
Phoenix, AZ 85027
623-582-4592
www.sanone.com

Mike Flannery, Vice President/General Manager, Sales & Marketing
mflannery@sanone.com, 623-582-4592
Dr. Jon Persavich, Director, Professional Services
jpersavich@sanone.com, 623-582-4592
Murray McIntosh, Director, Regional Sales
mmcintosh@sanone.com, 623-582-4592

SanOne delivers data advantage by leveraging existing investments, enhancing critical applications while integrating optimum technology. We provide a comprehensive flow analysis focused on what, where, and how your data is stored, backed up and retrieved. *(SD/S,SN,DM,SRM,S)*

SanStor
317 Birchwood Park Dr., Suite 111
Virginia Beach, VA 23452
757-340-7559
www.indisnet.com

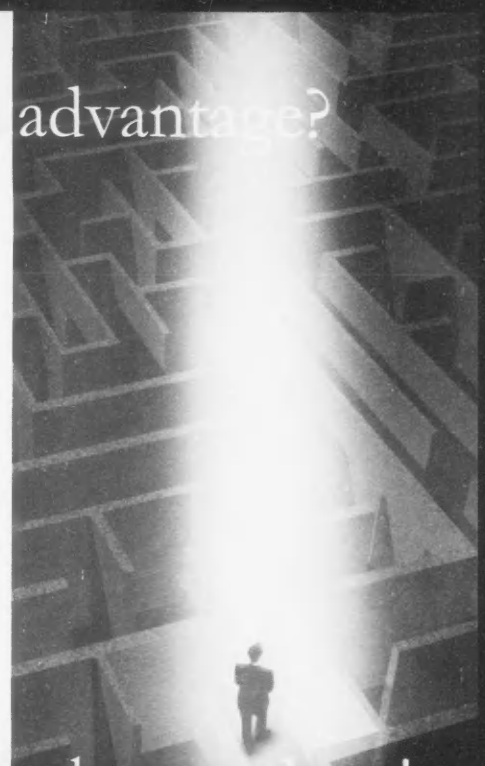
Looking for data advantage?

our SAN solutions...

Leverage existing investment

Enhance critical applications

Integrate optimum technology



sanone will take you there!

McDATA · HITACHI DATA SYSTEMS · BakBone SOFTWARE · StorageTek · Exabyte · LEGATO · DataCore SOFTWARE · VIXEL · StoreAge · VERITAS · qlogic · ATTO · gadzoox · CROSSROADS · Computer Associates · EMULEX NETWORK SYSTEMS · eurologic

Corporate: **Alaneo Technologies, Inc.** (NASDAQ: ALAN)
Companies: Arraid - **SanOne** - Excel/Meridian
Contact: (877) 582-4592 info@sanone.com www.sanone.com
Offices: Phoenix - Los Angeles - Dallas - Chicago - Miami

©2000 SanOne. All trademarks and registered trademarks are property of their respective owners.

sanone

TECHNOLOGY SERVICES EDUCATION

SanSupport.com/ITIS Services
50 Day St.
S. Norwalk, CT 06854
203-838-9888
www.itisservices.com

Sonia Camara, Manager, Marketing Services
scamara@itisservices.com, 203-838-9888
Fred T. Busk, President/Chief Executive Officer
fbusk@itisservices.com, 203-838-9888
Brendan Reilly, Executive Vice President/Chief Technology Officer
brendan@itisservices.com, 203-838-9888

SanSupport/ITIS Services focuses exclusively on the rapid deployment, delivery and support of intelligent Storage Area Network (SAN) solutions. A comprehensive provider of SAN support, services, and information. Combining Technology with Knowledge. *(SD/S,SNI,DM,SRM,OSM,S)*

AlphaStor

SCH Technologies
895 Central Ave.
Cincinnati, OH 45202
513-579-0455
www.alphastor.com; www.sch.com

Denise Reier, Vice President, Marketing
dreier@sch.com, 513-579-0455 x254
Jeff Porter, Director, Storage Management
jporter@sch.com, 513-579-0455 x324
Dennis Hyde, Vice President, Sales
dhyde@sch.com, 513-579-0455 x211

A comprehensive software suite for advanced media, library and SAN management. AlphaStor™ enables you to manage all of your removable storage media from one product, from one console, from anywhere. Visit our website to learn about this and other software solutions.

Seagate Technology
920 Disc Dr.
Scotts Valley, CA 95066
877-271-3285
www.seagate.com

SearchStorage.com
c/o Tech Target.com
117 Kendrick St.
Needham, MA 02494
781-657-1000
www.searchstorage.com

Seek Systems

Seek Systems Inc.
11715 N. Creek Pkwy. S., Suite 110
Bothell, WA 98011
800-790-7335
www.seeksystems.com

Bruce Rodgers, Vice President, Sales
brodgers@seeksystems.com, 800-790-7335

FasFile RAID is high-performance RAID storage with up to 2TB of capacity. FasFile Xcelerator is a storage appliance that increases the performance of installed SCSI disk storage. *(SD/S,DM)*

SFS/Netready
617 Curtin Pl. S.E., Suite 100
Leesburg, VA 20175
800-443-2507
www.netready.com

Siemens
3860 N. First St.
San Jose, CA 95134
408-428-7071
www.siemens.com

Simple Technology
3001 Daimler St.
Santa Ana, CA 92705
949-476-1180
www.simpletech.com

SMART STORAGE
Ideas in Storage Software

Smart Storage Inc.
100 Burtt Rd.
Andover, MA 01810
978-623-3300
www.smartstorage.com

Bob McIntosh, Public Relations
978-623-3300 x166

Smart Storage provides archival storage, storage management, and data protection solutions. The SmartStor family of products manages all types of CD, DVD, MO, and tape storage devices from today's leading manufacturers in Windows NT, NetWare, and Unix environments.

SMS Data Productions Group
22930 Shaw Rd.
Sterling, VA 20166
703-709-9898
www.sms.com

Solid Data Solutions
22 Campbell Ct.
Bramley, Hants, RG26 5EG, United Kingdom
44 0 1256 882111
http://193.195.36.197

SolidData

Solid Data Systems
2945 Oakmead Village Ct.
Santa Clara, CA 95051
408-845-5700
www.soliddata.com

Michael Casey, Vice President, Marketing
micasey@soliddata.com, 408-845-5700
Duke Lambert, Vice President, Sales
dlambert@soliddata.com, 408-845-5700
Vicki Vollmar, Director, Product Marketing
vvollmar@soliddata.com, 408-845-5700

Solid Data turbocharges e-transaction applications with file caching appliances based on solid-state disk (SSD) technology. These products enable ISPs, ASPs and e-business to multiply the performance and scalability of their application servers and network infrastructure. *(SD/S,SNI)*

Solution Technology
P.O. Box 104
Boulder Creek, CA 95006
831-338-4285
www.soltechnology.com

Sony
1 Sony Dr.
Park Ridge, NJ 07656
201-930-6599
www.sony.com

Sourcetek Systems Inc.
78 September Dr.
Greenland, NH 03840
888-486-7556
www.sourceteksystems.com

Albert Conte, Manager, Sales
adconte@sprynet.com, 603-430-2155

As a tape and disk storage VAR representing today's leading storage product manufacturers, we work with you to "source" the right technologies and deliver cost-effective, efficient solutions.

Spectra Logic Corporation
1700 N. 55th St.
Boulder, CO 80301
303-449-6400
www.spectralogic.com

Britt Terry, Director, Marketing
brittt@spectralogic.com, 303-449-6400
Hossein ZiaShoken, Vice President, Advanced Engineering
hosseinz@spectralogic.com, 303-449-6400
Patrick Mayock, Director, Sales
patm@spectralogic.com, 303-449-6400

Spectra Logic Corporation is a leading manufacturer of high-performance automated tape libraries. Additionally, Spectra Logic develops advanced interface technologies for emerging storage networking architectures such as Storage Area Networks and Network Attached Storage. *(SD/S,SNI,DM,OSM)*

Spectrum Computer Corporation
12611 Hoover St.
Garden Grove, CA 92841
714-799-7345
www.spectrumcom.com

Spinnaker Networks
107 Gamma Dr.
Pittsburgh, PA 15238
412-968-9116
www.spinnakernet.com

SPIRENT

Spirent Communications
26750 Agoura Rd.
Calabasas, CA 91302
818-676-2300
www.spirentcom.com

Mark Fishburn, Vice President, Marketing
mark.fishburn@spirentcom.com, 818-676-2300
Gene Zhang, Vice President, Engineering
gene.zhang@spirentcom.com, 818-676-2300
Jim Jordan, Vice President, Worldwide Sales
jim.jordan@spirentcom.com, 818-676-2300

Spirent Communications, the world leader in performance analysis solutions, brings together the award-winning products of Adtech, DLS, GSS, SmartBits, TAS and Zarak. *(SD/S,SNI,DM,SRM,OSM,S)*

OPEN FILE MANAGER

St. Bernard Software
16882 W. Bernardo Dr.
San Diego, CA 92127
858-676-2277
www.stbernard.com

Gary Stowell, Vice President, Marketing & Business Development
gstowell@stbernard.com, 858-676-2277
Gary Pritchett, Vice President, Engineering
garyp@stbernard.com, 858-676-2277
Ed Hubler, Vice President, Sales
ehubler@stbernard.com, 858-676-2277

Open File Manager provides 24x7 data protection to NT/2000 and NetWare servers by enabling ANY backup program to capture open files around-the-clock – even if the files are changing or still in use! *(DM,SRM)*

Stargate Solutions Inc.
2160 Lundy Ave., Suite 210
San Jose, CA 95131
408-954-8302 x110
www.sgates.com

STORABILITY

Storability Inc.
118 Turnpike Rd.
Southborough, MA 01772
508-229-1700
www.storability.com

Kirby Wadsworth, Vice President, Marketing
kirby.wadsworth@storability.com, 508-229-1700
Hemant Kurande, Vice President, Solutions Architecture
www.storability.com, 508-229-1700
Matthew Westover, Chief Executive Officer
matt.westover@storability.com, 508-229-1700

Storability, the world's first Storage Assurance Provider, creates and manages customer-dedicated storage solutions throughout the enterprise on a pay-for-service basis. Storability's innovative new approach is revolutionizing the storage industry by delivering customizable solutions that help customers achieve their business and financial objectives. *(SNI,S)*

Storactive
4551 Glencoe Ave., Suite 150
Marino del Rey, CA 90292
310-302-7280
www.gdev.com

Storage 2000
1601 N. Bond, Suite 110
Naperville, IL 60563
630-655-0786
www.storage2000.com

StorageApps

StorageApps
1001 Frontier Rd.
Bridgewater, NJ 08807
908-243-8700
www.storageapps.com

Andrew Lona, Chief Marketing Officer
andrew.lona@storageapps.com, 908-243-8730
Michael Feinberg, Executive Vice President/Chief Technology Officer
mike.feinberg@storageapps.com, 908-243-8722
Dan Gittleman, Chairman/Chief Executive Officer
dan.gittleman@storageapps.com, 908-243-8752

StorageApps offers smarter choices through our Proactive Network Storage Solutions™ portfolio so you can plan, organize, direct and monitor information residing on a variety of systems, servers and storage devices. *(SD/S,SNI,DM,SRM,OSM,S)*

Storage Area Networks Inc.
Rustat House, 62 Clifton Rd.
Cambridge, CB1 7EG, United Kingdom
44 0 1223 566111
www.san.com

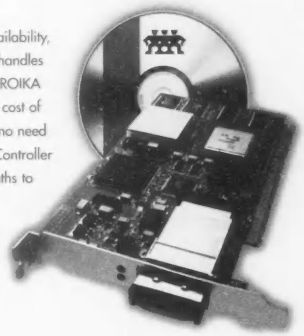
Storage Concepts
14352 Chambers Rd.
Tustin, CA 92789
949-852-8511
www.storageconcepts.com

Anywhere, Anytime

Customers Need Access To Your Data

Because you are expected to provide continuous application availability, Troika Networks' Dynamic Multipathing is the solution for you. It handles environments as diverse as departments to data centers. TROIKA remarkably simplifies administration and correspondingly lowers cost of achieving continuous application availability – because there is no need for complex components to be managed. The Zentai™ Controller revolutionizes access to storage data by using all available paths to a storage device, including tape devices, JBODs and RAID.

To learn more about what Dynamic Multipathing can do for you, visit www.TroikaNetworks.com for white papers and product information.



TROIKA™

The Zentai™ Controller and Management Software provides essential elements for designing and building server and storage area networks. TROIKA pioneered the use of three protocols in one PCI-to-Fibre Channel controller: SCSI for storage, IP for storage network functions like backup, and VI for server-to-server.

StorageNetworks
100 Fifth Ave.
Waltham, MA 02451
781-434-6700
www.storagenetworks.com

John Clavin, Executive Vice President, Sales & Marketing
john.clavin@storagenetworks.com, 781-434-6700
Bill Miller, Co-Founder/Executive Vice President/Chief Technology Officer
bill.miller@storagenetworks.com, 781-434-6700

StorageNetworks Inc. (NASDAQ: STOR) is the Storage Service Provider (SSP) for the e-Economy and an innovator that is making managed data storage services as accessible as phone or electric utility services. www.storagenetworks.com *(SN,DM,SRM,OSM,S)*

Storagenow.com
16751 Millikan Ave.
Irvine, CA 92606
800-495-8700
www.storagenow.com

StorageProvider
13201 N.W. Fwy. 300
Houston, TX 77040
713-462-1520
www.storageprovider.com

Dianne Sierra Hirsch, Director, Communications
dianne.sierra.hirsch@storageprovider.com, 713-462-1520
Sheila Childs, Director, Technical Marketing
sheila.childs@storageprovider.com, 713-462-1520
Mike Reeves, Director, Sales
mike.reeves@storageprovider.com, 713-462-1520

StorageProvider is a leading managed data storage services company for the Internet economy. With a focus on providing customers with storage expertise, customized functionality and rapid implementation, StorageProvider gives companies a sustainable competitive advantage. *(SD/S,SN/LDM,SRM,OSM,S)*

StoragePoint.com
12310 World Trade Dr.
San Diego, CA 92128
858-676-3900
www.storagepoint.com

StorageTek
One StorageTek Dr.
Louisville, CO 80028
800-786-7835
www.storagetek.com

Joel Kimball, Vice President/General Manager, Eastern Sales
joel_kimball@storagetek.com, 860-290-3545
Jim Lucas, Vice President/General Manager, Western Region
james_lucas@storagetek.com, 949-567-4215
Michael McLay, Vice President/General Manager, Central Region
michael_mclay@storagetek.com, 905-212-6500

StorageTek is the only global information storage provider to use "Open, Intelligent and Integrated" solutions to promote the efficient use of critical information and to remove the information management constraints that inhibit business growth. Our competencies – storage automation, virtual storage and open SANs (storage area networks) – effectively manage the explosion of information, save time and money, and maximize personnel resources. *(SD/S,SN/LDM,SRM,S)*

StorageWay
3501 W. Warren Ave.
Fremont, CA 94538
510-445-3510
www.storageway.com

StorCase Technology Inc.
17600 Newhope St.
Fountain Valley, CA 92708
800-435-0642
www.storcase.com

StoreAge Networking Technologies
Gutwirth Science Center, Technion City
Haifa, Israel 32000-8894
972 4 832 9030
www.store-age.com

Dani Naor, Director, Business Development
dnaor@store-age.com

SAN Volume Manager (SVM), a SAN Appliance that provides virtual volume management in heterogeneous environments. Using intuitive GUI, all enterprise storage resources are virtualized and selectively presented to users, featuring physical device monitoring, volume definitions and storage allocations for all servers and storage connected to the Fibre Channel loop or fabric. *(SRM,OSM)*

StorLogic Inc.
100 Technology Park, Suite 175
Lake Mary, FL 32746
407-333-9998
www.storlogic.com

StorNet
20 Courthouse Sq., Suite 206
Rockville, MD 20850
301-309-3544
www.stornetgs.com

Stratos Lightwave
7444 W. Wilson Ave.
Chicago, IL 60706
708-867-9600
www.stratoslightwave.com

Stratus Computer Systems Ireland Ltd.
Blanchardstown Industrial Park
Blanchardstown, Dublin 15, Republic of Ireland
35 3 1 809 6000
www.stratus.ie

Sun Microsystems Inc.
901 San Antonio Rd.
Palo Alto, CA 94303
650-960-1300
www.sun.com

Sun Microsystems Network Storage offers customers a complete family of network storage systems and storage management software. The Sun StorEdge™ line of tape backup management software and data services address consolidated storage networks and storage area networks. *(SD/S,SN/LDM,SRM,OSM,S)*

Sunrise Computer Services
1 Carrera House, Merlin Ct.
Gatehouse Close
Aylesbury, Bucks, HP19 3DP, United Kingdom
01296 330833
www.sunrise-comp.co.uk

Surgient Networks
3520 Executive Center Dr., Suite 300
Austin, TX 78731
512-241-4600
www.surgient.com

SWS/Storagepath
917 Lawrence Dr.
Newbury Park, CA 91320
805-498-6727
www.storagepath.com

Synaxia Networks Ltd.
2672 Bayshore Pkwy., Suite 520
Mountain View, CA 94043
650-623-0152
www.synaxia.com

Syncsort Inc.
50 Tice Blvd.
Woodcliff Lake, NJ 07677
201-930-9700
www.syncsort.com

Vic Werner, Director, Marketing
vwerner@syncsort.com, 201-930-9700
Ira Goodman, Manager, Software Services
igoodman@syncsort.com, 201-930-9700
Michael Kuehn, Manager, Sales
mkuehn@syncsort.com, 201-930-8200

Backup Express is a high-performance, enterprise-wide backup system and is the simplest way to secure vast amounts of data. Backup Express can be used both in Windows or NetWare environments. *(DM,SRM)*

Syntax Systems Inc.
33650 6th Ave. S.
Federal Way, WA 98003
253-838-2626
www.syntax.com

If you're a storage networking technician...

ITIS Services, the leader in storage networking solutions, wants you!

SANSupport.com

ITIS Services is proud to announce the launch of the world's only e-support service dedicated exclusively to enterprise storage networking support. SANSupport.com is becoming the ultimate resource for technical expertise and support of storage networks. Here's your chance to become part of it! Sign up to be a SANSupport.com expert and receive a free SANSupport.com t-shirt, plus the chance to win a Rolex! Earn extra cash and points toward all sorts of cool stuff. Not to mention you'll play a personal role in helping to facilitate and support some of the world's largest SAN implementations. Create a name for yourself in the global SAN community and make some extra cash!

Sign up today!

ITIS SERVICES

Visit the ITIS Services booth at Storage Networking World to sign up, or go to http://www.itisservices.com.

Powered by Raging Knowledge

Syntegra
4201 Lexington Ave. N.
Arden Hills, MN 55126
651-415-4401
www.syntegra.com

Systran
4126 Linden Ave.
Dayton, OH 45432
937-252-5601
www.systran.com

Tandberg Data ASA
2685 A Park Center Dr.
Simi Valley, CA 93065
805-579-1000
www.tandberg.com

Tantia Technologies
4855 Riverbend Rd., Suite 100
Boulder, CO 80301
303-247-1112
www.tantiatech.com

Technical Cable Concepts
350 Lear Ave.
Costa Mesa, CA 92626
714-835-1081
www.techcable.com

Technologic Software
4199 Campus Dr.
Irvine, CA 92612
949-509-5000
www.technologic.com

Tektronix
14200 S.W. Karl Braun Dr.
P.O. Box 500
Beaverton, OR 97077
800-835-9433
www.tek.com

TeraMach Technologies Inc.
18 Auriga Dr., Suite 100
Nepean, Ontario, K2E 7T9, Canada
613-226-7775 x247
www.teramach.com

Texas Instruments Inc.
12500 TI Blvd.
Dallas, TX 75243
800-336-5236
www.ti.com

Tivoli

Tivoli Systems, Inc.
9442 Capital of Texas Hwy. N.
Austin, TX 78759
800-2TIVOLI
www.tivoli.com

Paul Ellis, Director, Marketing, Storage
Paul_Ellis/Tivoli Systems@Tivoli.com, 408-361-0500

Tivoli Systems delivers true end-to-end information management for your storage environment. Products include Tivoli Storage Manager, Tivoli Storage Network Manager, Tivoli SANergy, Tivoli Data Protection for Applications and Databases, Tivoli Disaster Recovery Manager, and Tivoli Space Manager. *(SD/S,SNI,DM,SRM)*

Tokyo Electron America Inc.
2400 Grove Blvd.
Austin, TX 78741
512-424-1000
www.telusa.com

Tomtec Company Ltd.
Asakusabashi Sugiura Bldg., 7F
1-23-4 Yanagibashi, Taito-Ku
Tokyo, Japan 111-0052
81 03 5687 9305
www.tomtec.co.jp

Total Tec Systems Inc.
2 Gourmet Ln.
Edison, NJ 08837
732-906-6500
www.totaltec.com

Traakan Inc.
111 Main St., Suite 5
San Altos, CA 94022
650-947-1580
www.traakan.com

Tracer Technologies Inc.
806 W. Diamond Ave., Suite 100
Gaithersburg, MD 20878
301-721-2800
www.tracertech.com

Transoft Networks Inc.
600 E. Montecito St.
Santa Barbara, CA 93101
805-883-4300
www.transoftnetworks.com

TRICORD

Tricord Systems Inc.
2905 N.W. Blvd., Suite 20
Plymouth, MN 55441
763-557-9005/800TRICORD
www.tricord.com

Based on revolutionary distributed file system technology, Tricord's innovative server appliances bring seamless expansion with unprecedented ease of management to business services ranging from storage and content management to e-Commerce. *(SD/S,SRM)*

Trident Data Systems
5933 W. Century Blvd., Suite 700
Los Angeles, CA 90045
310-645-6483
www.tds.com

Trilliant Group

Trilliant Group
Three Centennial Plaza
895 Central Ave.
Cincinnati, OH 45202
513-579-0405
www.trilliant-group.com

Debbie B. Phipps, Director, Marketing
dphipps@trilliant-group.com, 513-579-0405 x250
Dale Miller, Managing Partner
dmiller@trilliant-group.com, 513-579-0405
Dan Bagot, Senior Partner
dbagot@trilliant-group.com, 513-579-0405 x337

Trilliant Group is a vendor-neutral IT consulting and integration firm focused exclusively on storage and dedicated to the delivery of services rather than to the sale of any hardware or software products. The company maintains leading-edge knowledge of evolving storage management technologies to provide the best expertise available in the industry. Trilliant Group professionals are equipped with proven, structured approaches and can be dedicated to improvement projects from start to finish. *(S)*

Trilogy Software Inc.
6034 W. Courtyard Dr.
Austin, TX 78730
512-794-5900
www.trilogy.com

Trimension Systems Inc.
303 Potrero St. #50
Santa Cruz, CA 95060
831-426-6300
www.trimension-inc.com

Trimm Technologies
350 Pilot Rd.
Las Vegas, NV 89119
702-263-2310
www.trimm.com

TROIKA

Troika Networks Inc.
2829 Townsgate Rd., Suite 200
Westlake Village, CA 91364
805-371-1377
www.troikanetworks.com

Brenda Christensen, Vice President, Marketing
brenda@troikanetworks.com, 805-370-2630
Bill Terrell, Vice President/Chief Technology Officer
terrell@troikanetworks.com, 805-370-2612
Al Duras, Vice President, Worldwide Sales
aduras@troikanetworks.com, 805-370-3005

TROIKA's ZENTAI controller and management software combines the three popular networking functions – FC-VI for application networking and server clustering communications, FCP-SCSI for server-to-storage and IPFC for server-to-server communicatons – in one controller. *(SNI)*

TrueSAN Networks
60 S. Market St., Suite 1050
San Jose, CA 95113
408-817-9050
www.truesan.com

Introducing a smarter way to manage critical business information

Proactive Network Storage Solutions™

And introducing StorageApps... the only company offering this innovative approach that lets you put your information to work. Today. Everyday. Not someday.

We've been providing advanced storage solutions to the most demanding global customers for years. And many of those customers are now members of the StorageApps team, sharpening our insight into real-world issues. So we understand the challenges you face. And we understand good products don't equal a complete solution if they can't work together. So we took a smarter approach.

Our Proactive Network Storage Solutions build intelligence into your IT infrastructure so you can plan, organize, direct and monitor business information across all your systems, servers and storage devices.

The flagship of this approach is SANLink™, powered by SAN.OS™ and SANSuite™. It's a complete solution that provides any-to-any connectivity, business continuity, lights-out management, optimum security, and 24x7 service and support.

Interested in putting your information to work? Let us introduce ourselves to you. Visit us at www.storageapps.com

StorageApps™

Where Information Works™

Copyright © 2000 StorageApps Inc.

UNIconn Corporation
127 Jing An Rd.
Chung Ho City, Taipei, Taiwan, R.O.C.
886 2 29481518
www.uniconn.com.tw

UDI

Unique Digital Inc.
10595 Westoffice Dr.
Houston, TX 77042
713-777-0447
www.uniquedigital.com

UDI has provided state-of-the-art disk and storage solutions for over 14 years. We specialize in complete solutions including the latest in tape technology such as the LTO. *(SD/S,SNI,DM,SRM,OSM,S)*

United Digital Ltd.
12 Westfield Rd., Southam
Royal Leamington Spa
Warwickshire, CV47 0JH, United Kingdom
44 0 1926 810 000
www.u-digital.com

US Design Corporation
9075 Guilford Rd.
Columbia, MD 21046
410-381-3000
www.usdesign.com

Vangard Technology
11211 E. Arapahoe Rd.
Englewood, CO 80112
800-840-6090
www.vangard.com

Verisys
335-H Spreckels Dr.
Aptos, CA 95003
831-662-7900
www.verisys.com

VERITAS

VERITAS Software Inc.
1600 Plymouth Ave.
Mountain View, CA 94043
650-335-8000
www.veritas.com

Mark Griffiths, Senior Director, Corporate Marketing
Fred van den Bosch, Executive Vice President, Product Groups
Joe Julian, Vice President, Sales, Americas

The leading enterprise-class application storage management software provider, VERITAS Software ensures continuous availability of business-critical information by delivering integrated, cross-platform storage management software solutions and services. *(DM,OSM,S)*

Vetrol Data Systems Inc.
2500 13th Ave.
Vero Beach, FL 32960
561-562-1621
www.vetrol.com

Vicom Systems Inc.
1157 San Antonio Rd.
Mountain View, CA 94043
650-964-6200
www.vicom.com

VIEO

VIEO Inc.
12416 Hymeadow Dr., Suite 200
Austin, TX 78750
512-257-3031
www.vieo.com

Steve Harriman, Vice President
sharriman@vieo.com, 512-257-3031 x110
Jim Mott, Chief Technology Officer
jim@vieo.com, 512-257-3031 x104
Bob Pearson, Vice President, Business Development
bpearson@vieo.com, 512-257-3031 x115

VIEO, a leading provider of high-performance I/O networking technologies, is partnering with ASIC, server, fabric, operating system and systems management vendors to provide InfiniBand operation and management solutions. *(SNI,SRM,S)*

Vision Solutions Inc.
17911 Von Karman Ave., 5th Floor
Irvine, CA 92614
949-253-6500
www.visionsolutions.com

Vitesse Semiconductor
741 Calle Plano
Camarillo, CA 93012
805-388-3700
www.vitesse.com

VIXEL

Vixel Corporation
11911 N. Creek Pkwy. S.
Bothell, WA 98011
425-806-5509
www.vixel.com

Brian Reed, Senior Director, Business Development
breed@vixel.com, 425-806-4323
Stuart Berman, Chief Technology Officer
sberman@vixel.com, 949-788-6362
Ron van Trapp, Vice President, Sales
rvontrapp@vixel.com, 510-979-2058

Vixel Corporation is a leading provider of Storage Area Network (SAN) hubs and transceivers as well as integrated management software. *(SNI,SRM)*

Western Digital
8105 Irvine Center Dr.
Irvine, CA 92618
949-932-5000
www.westerndigital.com

Western Scientific
9445 Farnham St.
San Diego, CA 92123
858-565-6699
www.wsm.com

Winchester Systems
149 Middlesex Tpke.
Burlington, MA 01803
781-933-8500
www.winsys.com

WORLDSTOR

WorldStor Inc.
3975 Fair Ridge Dr., Suite 400S
Fairfax, VA 22033
703-278-4000
www.worldstor.com

Elizabeth Batenhorst, Manager, Marketing
liz.batenhorst@worldstor.com, 703-278-4050
Steven Bishop, Chief Technology Officer
steven.bishop@worldstor.com, 703-278-4002
Ashby Lincoln, Vice President, Worldwide Sales
ashby.lincoln@worldstor.com, 703-278-4058

WorldStor, a leading Storage Services Provider, offers data storage, backup, replication, and professional services for e-business. WorldStor helps companies reduce time-to-market, alleviate IT staff shortages, and protect and deliver their critical data. *(SNI,DM,SRM,OSM,S)*

WQuinn
1881 Campus Commons Dr., Suite 105
Reston, VA 20191
703-758-0707
www.wquinn.com

Xdrive
3002 Pennsylvania Ave.
Santa Monica, CA 90404
310-883-2899
www.xdrive.com

Xenstone Storage Systems Ltd.
Hamilton House, 111 The Marlowes
Hemel, Hempstead, HP1 1BB, England
44 1442 403300
www.xenstone.ch

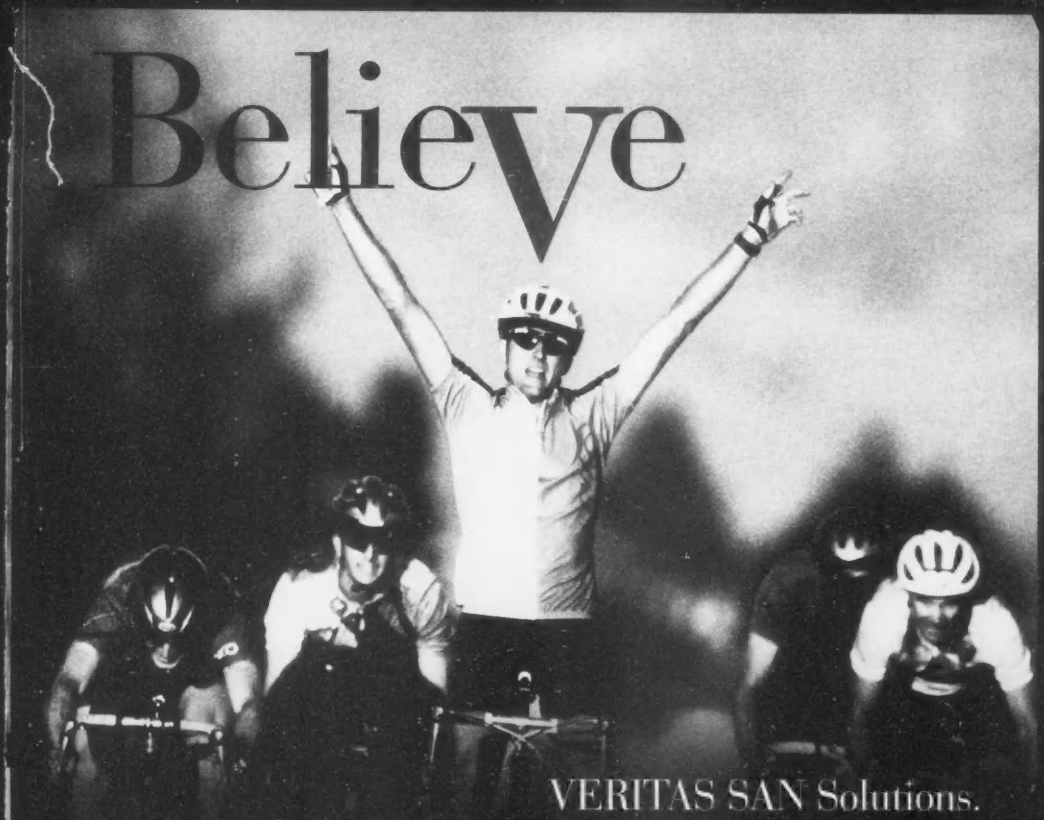
Yotta Yotta Inc.
4030 Lake Washington Blvd. N.E., Suite 201
Kirkland, WA 98033
425-739-9191 x226
www.yottayotta.com

Zzyzx Peripherals, Inc.
Storage solutions by design

Zzyzx Peripherals Inc.
5893 Oberlin Dr. #102
San Diego, CA 92121
800-876-7818
www.zzyzx.com

Mary June Makoul, Vice President, Marketing
maryjune@zzyzx.com, 858-558-7800
Steve Yamasaki, Vice President, Sales
yama@zzyzx.com, 858-558-7800
Gary Hutchins, Vice President, Technology
gary@zzyzx.com

Zzyzx is the leading manufacturer and distributor of storage solutions for Unix and Microsoft Windows NT environments. Product lines include RAID Arrays, customized SANs, turnkey tape backup solutions and storage related peripherals. *(SD/S, SNI, DM, SRM, OSM, S)*



VERITAS SAN Solutions.

Believe in the power of software to simplify your storage management.

Using a wide range of VERITAS SAN Solutions, from data availability software to SAN management to consulting, IT managers all over the world are employing the power of SANs to simplify their lives.

Believe in the power of VERITAS, The Data Availability Company™, to deliver SAN solutions today.

For more information on VERITAS SAN Solutions and VERITAS SAN partnerships, go to www.veritas.com/san.

VISION2000 VERITAS

Register today for VERITAS VISION™ 2000

VERITAS™

BUSINESS WITHOUT INTERRUPTION™

1-800-729-7894 code: 83613L | www.veritas.com

COMPLEXITY
STRESS HEADACHES
INSANITY DATA LOSS
DOWNTIME FRUSTRATION
WORRY PAIN

relief.

Want to simplify your life? Contact DataCore Software™. Our SANsymphony™ storage networking software virtualizes storage, creating a shared pool from networked storage assets. In other words, you simply click, drag and drop. It's that easy. So log on to www.datacoresoftware.com/relief and get your free SAN assessment. You'll feel much better.

DataCore
SOFTWARE

© 2000, DataCore Software Corporation.

CEO Robert Palmer's No. 2 at Digital, heading worldwide sales and marketing. I met with both Claflin and Palmer about a year before Compaq's 1998 acquisition of Digital and came away convinced that Palmer would have the decency and good sense to step down so that the much more capable Claflin could take over. I was wrong. Claflin should have been named CEO the moment he joined the company after 22 years at IBM. But what really hurt is that Digital didn't correct that mistake in time. Fortunately for 3Com's users and investors, *it* did.

ALAN PALLER

Visa leads charge for better Web security

IMAGINE BOARDING an airplane knowing that no one is absolutely sure how to check its airworthiness and safety, and not knowing whether the people who checked your plane were qualified in any way. That's the world in which the vast majority of Internet-connected computer users live today.

Internet-connected computers are at risk. And it's clear that anyone who does business on the Net is vulnerable. Corrections, defenses or patches exist for most flaws, but when they're not installed, the systems are vulnerable and attacks succeed.

A key element that's missing in Internet security is a set of practical, widely accepted and nonproprietary operating standards specifying *in detail* how systems should be configured and operated. Such cybersecurity standards would be similar to the maintenance and preflight action standards that every airline uses and every passenger has a right to demand.

ALAN PALLER is director of research at the SANS Institute in Bethesda, Md. Contact him at paller@sans.org.

Without widely accepted standards, organizations will continue to install computers blindly, hoping they'll be protected by obscurity or luck. If the global economy weren't dependent on the Internet, such wishful thinking might be acceptable. But today, every unprotected system connected to a high-speed communications line is a loaded weapon that attackers can use against e-commerce leaders, communications and power companies, and national governments.

Of even greater risk for e-commerce is a business partner that doesn't protect its systems, thus putting every other electronic partner at risk. It isn't surprising, then, that Visa, the firm that stepped forward to begin solving the problem, is connected to a very large number of other companies. Visa processes $1.7 trillion in transactions every year, or more than $4 billion every day. To do that efficiently, Visa electronically partners with 21,000 merchants that carry its logo.

In late July, Visa issued a new set of 10 requirements that each merchant partner must meet if it wants to keep the logo. They range from having specific firewall settings to changing default passwords, and they cover patches, encryption, antivirus software and more. What makes Visa's "Ten Commandments" so valuable is that they're practical. Most organizations that understand security already comply with them. Visa's great contribution is bringing the security neophytes up to a safety level comparable to that of security-savvy organizations.

Visa has provided the Internet community with an effective starting point for creating the global standards on which Internet safety can be built, but there are still significant tasks to be completed. Visa's starting point must be broadened to encompass the new security requirements being established by law (such as in the Health Information Portability and Accountability Act of 1996) and those followed by auditing and international standards organizations.

To accomplish that, representatives of dozens of federal, state and local government agencies are working with academics and corporations (led by representatives of Visa and Merrill Lynch) to convert the Visa effort into one global set of standards.

Their not-for-profit organization (which my organization also helped form) is called the Center for Internet Security. Every organization that wants improved Internet safety can help make the center's efforts successful by participating in the process of shaping the standards, ensuring that every deployed system has been made safer in accordance with the standards and ensuring that those settings have been validated by someone who has been certified to test compliance.

There can be no confidence in the Internet's reliability without broad-based security. It's time to stop whining about the lack of security and start ensuring that every system of every business partner meets at least minimum safety standards.

READERS' LETTERS

Protected payment

CONSUMERS should be wary of using new forms of payments ["Older Systems Hinder E-Payments," Page One, Sept. 25]. There are a great many legal protections for payment by check or credit card that don't exist for new forms of payment.

In addition, standard business and legal practices already exist for these older forms of payment. If proof of payment is required, a canceled check or signed credit card receipt is acceptable to a business or a court.

David Brosh
Principal
American Management Systems
Chicago
david_brosh@ams.com

All attacks significant

IN "FEDERAL Agencies Get Poor Grades for Security" [News, Sept. 18], the deputy CIO at the Department of Agriculture says that his agency fended off some 250 hacker attacks in the last quarter and that although a few of the attacks succeeded in altering Web pages, no significant damage was done. That's a very complacent view that is based on the fallacy that attacks that aim to alter Web pages are the only significant ones. The truly malevolent hacker will take care to hide his tracks, by means including the planting of executables that replace system executables.

Chris Ahlstrom
Naval Weapons Station
Charleston, S.C.

Respect the contract

IN THE column "Message to ASPs: Regulate or Be Regulated" [News Opinion, Oct. 2], Barbara Myles draws illogical conclusions and false facts from an isolated case.

To state that Pandesic's customers couldn't include language in their service-level agreements (SLA) to cover the costs of moving data is just naive. Had the SLAs been violated, causing customers damage, there is nothing stopping them from attempting to get relief from Pandesic's corporate parents, Intel and SAP.

But to say that regulation is needed and that if the ASPs themselves don't do it, the feds will step in, is sheer lunacy. Governmental bodies have no business interfering with what amounts to a legitimate contractual arrangement between companies. If companies aren't smart enough to protect their assets, intangible or otherwise, they deserve what they get when things go wrong.

Christopher Casey
President
Casey Advisory Services and Technologies Inc.
Concord, Mass.
casey@world.std.com

More Letters, page 41

Hard to take Microsoft's move at face value

IN READING "Maritz Resigns From Microsoft" [*Computerworld.com*, Sept. 14], I was struck that Vice President Paul Maritz will continue to work as a consultant to Microsoft on strategic and business issues. It makes me wonder whether the recent rash of resignations and retirements of people still working for/with Microsoft, now on a private/consulting basis, is just a way for the company to avoid regulations that apply only to permanent or in-house employees. Considering how much of the recent trouble it has been having is tied, for instance, to company e-mails, I begin to wonder if they're now outside the system so that they can claim more privacy rights and erase data and e-mails they wouldn't be allowed to if they were still in-house.

Paranoid? Maybe, but I have too much experience with Microsoft to trust anything it does at face value.

Carl Dershem
San Diego

COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

The future of your e-business
is being decided right here.

Do you really know what goes on in the minds of your e-customers? What they might be thinking about buying? Or not buying? And why? That's where you need e-Intelligence from SAS. With e-Intelligence, you can quickly integrate bricks-and-mortar data with clicks-and-mortar data. To reveal insights that can help you optimize online merchandising, recognize cross-selling opportunities, build greater customer loyalty, and establish more profitable relationships with your very best e-customers. To learn more about e-Intelligence from SAS, and what it can do for your business, phone 1-800-727-0025 or stop by **www.sas.com.**

The Power to Know.

LENNY LIEBMANN

Don't fall into the Web development speed trap

THE POEM "The Charge of the Light Brigade" describes an intrepid British cavalry unit that bravely rushed headlong to its own destruction. When it comes to e-commerce, many IT departments are following suit. While one must applaud their zeal and expediency, many are moving at light speed into an ambush — with potentially fatal results.

Speed itself isn't the problem. The danger arises from how companies are reaching that speed. Many are turning to strategic partners such as Web application server vendors and managed hosting services whose offerings promise to significantly accelerate time-to-market by eliminating the time and expense of developing e-commerce infrastructure in-house.

LENNY LIEBMANN is an independent consultant specializing in the alignment of IT resources with business goals. Contact him at lmann@home.com.

Unfortunately, there's a big price to be paid for this kind of fast-lane living. Sure, using one of today's sophisticated, prefabricated Web application server environments enables you to avoid a lot of the infrastructure development hassles that you'd encounter if you had to design all of your own database connectivity, object models and fail-over mechanisms from scratch. But the speed these vendors are selling is as addictive as what drug dealers peddle on the street.

Here's what tends to happen: An IT department gets major time-to-market pressures to roll out a new e-commerce offering. In order to make the deadline, it selects an application server vendor that can provide a lot of ready-made technology. But to take advantage of this bells-and-whistles application server, the department has to implement the company's e-commerce business logic using scripts, "wrappers" and/or other development components that are highly vendor-specific. If it works, it does the same thing again and again. Within a few months, all its critical business logic is firmly encased in a highly proprietary development environment. Voilà! Vendor lock-in!

What's particularly ironic about this phenomenon is that the Web was supposed to be the place where we were going to use pure standards — such as HTML, Java and XML — to avoid the proprietary quicksand of previous development environments. But in our rush to market, it seems we're willing to trade long-term openness for short-term business results.

There are some solutions to this problem besides avoiding application servers altogether. One is to choose your server based on the kind of exit strategy it provides rather than just going for maximum features. Another is the emergence of standards, such as Enterprise JavaBeans, which would make it easier to migrate software components from one application server to another.

But the most important solution may be to re-evaluate our obsession with pure speed and our overemphasis on being "first to market." As the honeymoon ends for many first-wave dot-coms, we're seeing that being first to market may simply be the first to fail. The right business model, a strong customer focus and flexible technology are more vital to profitability and growth than a press release with the word "first" in it. The race, as the Bible says, is not always to the swift.

So beware of the speed merchants — unless you really want someone to write a poem about your e-development brigade's valiant, senseless death at an early age.

WILLIAM M. ULRICH

The CIO has a new role for a new era

THE FACE OF information technology is changing. Business units, outsourcing vendors, application service providers (ASPs) and supply chain, electronic-market and other consortia have taken over many tasks that have traditionally fallen within IT. Dispersing the management of these functions has resulted in greater flexibility in deploying business-driven solutions, but it has also reduced IT's ability to standardize, streamline and coordinate IT-related functions.

This distribution of IT roles and responsibilities has also diminished the CIO's ability to impose policies and dictate results. Yet the CIO must still find ways to enable key business initiatives through the effective and efficient use of technology.

WILLIAM M. ULRICH is a management consultant and president of Tactical Strategy Group Inc. in Soquel, Calif. Contact him at tsginc@cruzio.com or through *www.system-transformation.com.*

Outsourcing and ASP vendors, distributed e-business initiatives and third-party consortia are here to stay, essentially ending the reigns of monolithic IT organizations at which CIOs had complete control over all information-management functions. But these new dynamics have given rise to fragmented initiatives that are poorly coordinated. Left unchecked, that fragmentation will escalate. To alleviate this situation, top-down command-and-control models must be replaced with organizing philosophies that facilitate communication, collaboration and adaptability.

The CIO is best suited to lead the enterprise into this new era. More than other top-level executives, he understands IT and how it enables business strategy. I have spoken with CIOs who understand the challenge of bridging the gap between business requirements and the ability to deliver solutions to fulfill those requirements in a timely manner. The CIO must be able to influence and inspire internal and external business units to work toward a common goal in a coordinated fashion. This requires the CIO to be a leader in developing a clear vision for IT and motivate executives and all employees to pursue this vision.

As part of IT's transformation into a collaborative organization, the CIO should strive to reshape IT so that distributed functions can be coordinated under a common information-management infrastructure. This requires bringing IT, business units and external business partners together to collaborate, share ideas and self-organize to accommodate ongoing change. The self-organizing aspect allows technical and business units to form working teams without reorganizing from the top down each time. The CIO, in tackling such an initiative, would demonstrate leadership by sacrificing command authority to create a more effective IT organization. In other words, decisions will be delegated to units performing the tasks associated with those decisions.

Here are three steps the CIO should take in transforming the IT organization:

1. Determine how information is processed and managed. The CIO and a cross section of business and IT representatives should convene focus groups with each business and technology unit that performs IT-related functions. This should include any third parties contracted to perform IT tasks. The findings establish a basis for the next steps, which include selling management on the need to transform the IT organization.

2. Work with a comprehensive cross section of business and IT representatives to develop a vision for the new IT organization. This new organization builds upon existing strengths while eliminating the bureaucracy that inhibits or discourages communication and collaboration. As part of the transition to this new organization, the CIO works with all relevant parties to define the purpose and principles that bind participants under a common organizational framework.

3. Finally, create an IT "constitution" that defines each group's purpose, role and relationship with other groups. In the new organization, the CIO has no direct reports but convenes a working council of representatives from each major functional area. As council chairman, the CIO becomes a strategist, motivator, collaborator and leader.

The CIO is in a unique position to deliver business strategies through IT. Change is always difficult, but a strong CIO will have the leadership qualities needed to steer the enterprise through these dynamic times. It's time the CIO leads the effort to reinvent IT — and the CIO's role — along the way.

Anyone you want to work with.

COMPAQ
IBM
DELL
hp invent
DIGITAL THE DOCUMENT COMPANY XEROX
EDS
AVAYA communication
UNISYS
ride the light Qwest
EMC² where information lives
Getronics
marchFIRST
KWORLD
NCR
Worldwide Information Systems Bull
CAP GEMINI ERNST & YOUNG
internosis
ICL
COMARK
Cambridge Technology Partners
GE Capital Information Technology Solutions
USi Making software simple.
Data General A Division of EMC
presence

These premier companies are ready to make Microsoft® Exchange 2000 Server work for you. Whatever your needs, their solutions are optimized to help Exchange 2000 Server perform for your business. To find out more, go to microsoft.com/exchange/partners

Where do you want to go today?
Microsoft

© 2000 Microsoft Corporation. All rights reserved. Microsoft and Where do you want to go today? are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

Feeding a growing

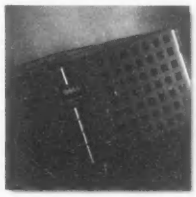
Dell offers a complete line of Intel®-based systems. Expand your e-business with robust Dell PowerEdge™ servers based on the Intel Pentium® III Xeon™ Processor, including the PowerEdge 8450 with up to eight processors and expandable to 32GB RAM.

Intel, the Intel Inside logo and Pentium are registered trademarks, and Pentium III Xeon is a trademark of Intel Corporation. Dell, PowerEdge and the Dell logo are registered trademarks of Dell Computer Corporation. Dell E Com and How E Works are trademarks of Dell Computer Corporation. These devices have not been approved by the Federal Communications Commission for use in a residential environment. These devices are not, and may not be, offered for sale or lease, or sold or leased for use in a residential environment until the approval of the FCC has been obtained.
© 2000 Dell Computer Corporation. All Rights Reserved.

Building an e-business isn't easy. But Dell can make it a lot easier.

PowerEdge® 2450
Front-end space-saving server

We've had the experience of growing to $15 billion a year in e-commerce. That's why we know what it takes: infrastructure like our reliable, rack-mountable, scalable Dell PowerEdge® servers. They can grow as easily as your e-business grows.



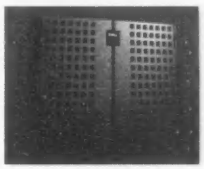
PowerEdge® 6450
Mission-critical e-business server

e-business made easy.

We also make it easier with everything from custom integration of your operating system options online to service centers that let you test your solution before you buy. Not to mention our on-site service and pre-failure alert program.

PowerApp®
Web and cache for turnkey Internet applications

All of which is why companies like Monster.com and NaviSite are powered by Dell PowerEdge servers with Intel Pentium® III Xeon™ processors.



PowerEdge® 8450
Back-end database server

Why not make the care and feeding of your e-business a lot easier?

800.501.DELL www.dell.com

DELL COM

Ignite Your Digital Branding

"If you want to get venture capital, you'd better read this book. Companies will either brand or die. It's up to you."

—Guy Kawasaki, CEO, *Garage.com*, Palo Alto, CA

"This book is a roadmap for exploiting the unique brand-building opportunities of the Net."

—Al Ries, *Ries & Ries Focusing Consultants*, Roswell, GA

"Michael has captured the essence of branding in the Internet age. His research is impeccable. This is a must read for anyone in marketing."

—Andy Brownell, Director of Marketing, *Compaq Computer Corporation*

Firebrands!
Building Brand Loyalty
in the Internet Age
MICHAEL MOON & DOUG MILLISON
$29.99
0-07-212449-0

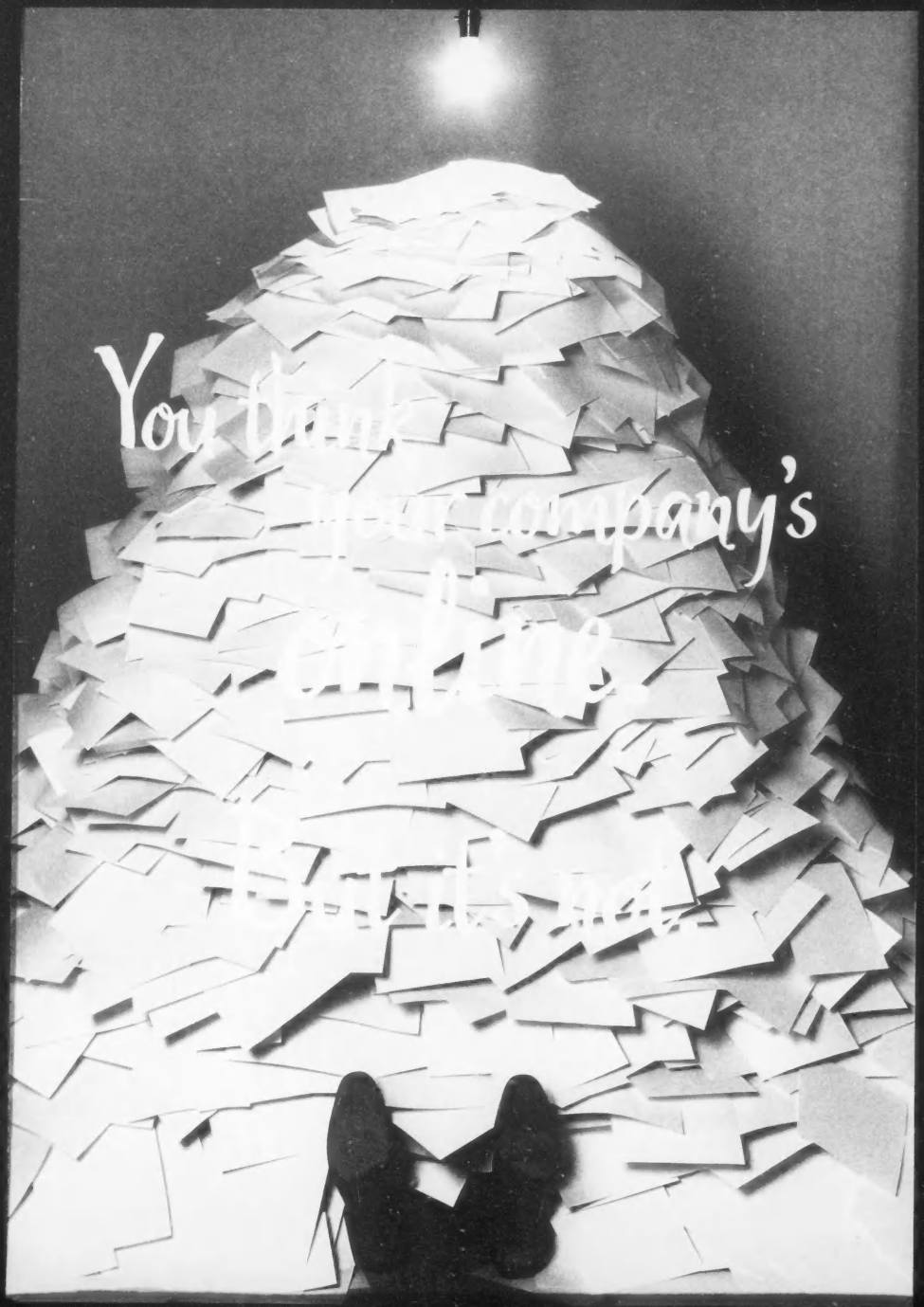
Learn how to extend your brand strategy by merging legacy marketing with Internet-specific techniques

Available at online retailers and bookstores everywhere.

For more information on these and other Osborne/McGraw-Hill titles, visit our website at www.osborne.com.

OSBORNE
www.osborne.com

COMPUTERWORLD
BOOKS FOR IT LEADERS


You think your company's

The bridge between the paper world and

Your investment in IT infrastructure is huge. And the impact of the Internet on your IT budget grows larger every day. You've poured tons of resources into ERP systems as well as e-mail and document workflow systems. How much? Well, studies show that as much as 50% of an average IT budget can be involved with managing documents.

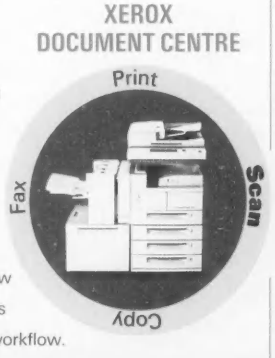
True, there are more documents online than ever before. But it's also true that we are creating more paper documents than ever before: twice as many as just five years ago. The reason is simple: Most companies have lots of off-ramps that turn electronic documents into paper documents, but almost no one has lots of on-ramps capable of converting paper documents into electronic ones.

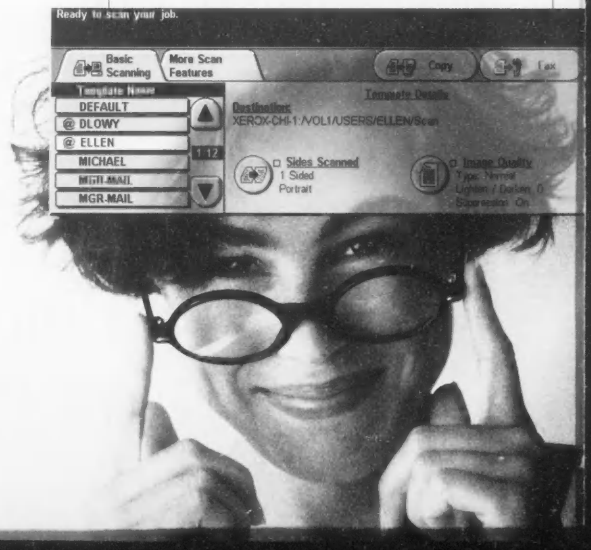
In fact, giving you new ways to leverage your IT investment by bridging the frustrating gap between the paper world and the electronic world is exactly what the Xerox Document Centre system was designed to do.

It's about document imaging for every workgroup.

If scanning is on your radar at all, you probably see it as limited to environments with dedicated operators. And so it has been. But the Document Centre system is changing that in big ways.

For starters, a Document Centre lets people work the way they are used to working—you can scan documents in the same place you print or copy them—it's that easy and that accessible. Of course, the Document Centre gives workgroups of 10 or more desktop control over everyday functions like printing, copying, PC faxing and finishing. What's more, by making document imaging an "everyday" function, the knowledge and information recorded in paper documents can now become a seamless part of the digital workflow.





the online world is now open for business.

Scan directly to the Web or virtually anywhere else you want to.

Going out to the hallway and scanning large documents into the digital stream at up to 65 ppm is certainly efficient, but the important question remains: Where is all that information going, and what can you do with it once it gets there?

Document Centre lets you scan directly to industry-standard messaging and collaboration platforms like Microsoft Exchange, Lotus Notes or Domino.Doc.

Scan 65 ppm

3 easy steps

1 Select scan folder
2 Select destination
3 Press green button

You can scan directly to a Web repository, so anyone has instant access to information from a remote location.

Scan to your PC desktop, and with ScanSoft PaperPort and TextBridge software bundled with Document Centre, you can drag and drop your scanned image into any one of 150 industry-standard applications. You won't need to re-key your documents.

OPEN ARCHITECTURE SYSTEMS

Microsoft
Windows NT 4.0 & 2000
Appletalk
Novell NetWare 4.X
PCL 6
Token Ring 14/16MB
TCP/IP
OS/2 WarpServer
Ethernet 10/100
Adobe PostScript 3

Or scan documents to the network, and using software like Xerox DocuShare, users can access them through any current Web browser on any platform. It gives you an electronic file cabinet that's a very efficient way to share knowledge and dramatically reduces e-mail traffic.

Or combine Document Centre with Xerox FlowPort. FlowPort is a Web-based software platform that manages the flow of documents from paper to digital and back again in dramatically new ways. For example, FlowPort gives mobile workers the freedom to access and print any documents on the Web without using a PC.

The Web
Microsoft Exchange Public Folders
Lotus Notes
Xerox DocuShare
Lotus Domino.Doc
PC Desktop

And when it comes to getting your digital documents back into paper form, Document Centre's open architecture supports all major industry printing standards and encourages third-party software solutions to thrive. So you can print not only from your desktop or from the Web, but also directly from your mainframe, including ERP applications like SAP.

In short, things once limited to paper are electronically archived, accessed, shared and easily printed wherever you need them. It doesn't just increase productivity, it decreases costs and saves time. Turn the page to learn how one of our customers is already benefiting.

Paper or digital, it's about solutions that leverage the network.

We have hundreds of customers who report impressive results. But here's one in-depth story of how a Document Centre solution reduced one organization's work-cycle time from three days to just three minutes.

The Customer:

Center for Technology Management, in a prominent Midwestern research institute.

The Problem:

There are dozens of huge file cabinets overflowing with documents—patents, notes and contracts about inventions the university owns. Each year up to 1,500 new folders are added. Every day, dozens of people call and request files. By law, the university must provide public access to any of these thousands of complex scientific documents for reference, revision, notation or collaboration. And it must be done for 25 years. The commitment of time, space and personnel is large and growing.

The Solution:

Combine Xerox FlowPort and DocuShare with two Document Centres. This gives you a search engine for all your documents.

Now when people need a document, they just check off the file they need on a FlowPort cover sheet, scan it into the Document Centre, and FlowPort software finds and sends the requested electronic file to a server that can print, e-mail or store the document. What's more, once the file is stored, DocuShare lets you manage it on the Web, giving authorized users instant access for viewing, downloading and printing documents from anywhere at any time.

The Result:

A process that used to take three days can now be completed instantaneously. Documents are accessed and shared electronically. Paper is eliminated while collaborative work processes are made simpler. Security is improved. Those 20 file cabinets are soon history. Costs are lowered. Time is saved.

Online or off, it's about a simpler way to share knowledge.

In a world of intranets and extranets, of e-commerce and the Internet, you need state-of-the-art technology and expertise to manage and share the documents that contain the knowledge in your organization. The Xerox Document Centre is a digital platform engineered from the ground up to eliminate the barriers between your paper and online documents.
Call us or visit our Web site for more information. And see how much you can increase productivity and control cost just by getting all your company's documents online.

1-800-ASK-XEROX, ext. online

www.xerox.com/online

DIGITAL
THE DOCUMENT COMPANY
XEROX

XEROX, The Document Company, the digital X, DocuShare, Document Centre, FlowPort and CentreWare are trademarks of XEROX CORPORATION. Microsoft and Windows are trademarks of Microsoft Corp. Adobe and Postscript are trademarks of Adobe Inc. All other trademarks are the property of their respective owners. Document Centre models are either newly manufactured or remanufactured and contain both new components and recycled components that are reconditioned. © 2000 XEROX CORPORATION. All rights reserved.

READERS' LETTERS

Tuition plan is in order

AFTER SIX months and a few thousand dollars in tuition spent to learn the fundamentals of client/server computing — in my case, PowerBuilder and Oracle — I had hopes of getting my foot in the door with at least some type of entry-level position, low salary and all. I have nearly 30 years of mainframe programming background, but apparently, even employers in rural areas are holding out for people with years of experience in the current technologies.

If employers refuse to hire U.S. citizens because of their lack of experience and insist on foreign workers, they should be required to fund some type of tuition relief for Americans who are returning to school to learn new skills and to subsequently use them in the workplace.

Raymond J. Strauss
Arlington Heights, Ill.
rayjkid@yahoo.com

Carnivore review process undermines privacy rights

THE GOVERNMENT will do all in its power to keep Carnivore secret and try to divert the review so that the people will never know if our freedom to privacy is being violated ["Government Error Exposes Carnivore Investigators; ACLU Blasts Team for Close Ties to Administration," *Computerworld.com*, Oct. 5]. I find it disgusting that truly independent people were not chosen to review Carnivore. And I believe that Congress and the courts are our only avenue to stop the government from being able to look into the people's private mail.

Russell B. Sharpe
Manager, support services
Saudi Operation & Maintenance Co.
Saudi Arabia

DID ANYONE *really* expect a thorough, truthful and accurate review? Congress has apparently shelved (read, "given up on") seriously considering any privacy legislation for at least the next 18 months, so why worry?

I hope all netizens carefully read the Wen Ho Lee interrogation transcript. It'll give everyone who's ever sent an e-mail some indication of what to expect when Carnivore gets hold of their communications.

Andrew Gettler
New York

ANYONE WHO doesn't have top-secret clearance wouldn't have a clue how to evaluate Carnivore. Anyone who does have top-secret clearance is compromised. Who are they going to pick? Santa Claus?

Ben Burrows
Princeton, N.J.

BellSouth has a glitch, too

ACCORDING to "Glitch at Amazon.com Exposes E-Mail Addresses" [News, Sept. 11], the company's "Associates" were shown the e-mail addresses of other associates.

I have seen an even worse glitch on BellSouth's Web site. When attempting to view previous months' phone bills, I was shown not my phone bills, but those of other BellSouth customers, including details of long-distance calls. I e-mailed BellSouth about this but received no response.

Paul Hammond
Huntsville, Ala.

The right .dir-ection

NOVELL'S proposal for a ".dir" Top Level Domain ["Novell Proposes .dir Domain for Directories," *Computerworld.com*, Oct. 6] makes a lot of sense to me. It is both a practical and elegant solution. The alternatives identified in the article (from Sun Microsystems and Alice's Registry) have major drawbacks, and partial implementation has proved to be problematic in the current environment.

The concept that the proposal should be rejected because it subverts the Internet "for commercial purposes" is ludicrous. Come on; businesspeople are people, too. They have a right to ask for things to work more efficiently and conveniently. Novell's idea does just that. It may not be a big idea, but it does make sense, and ICANN should go for it.

Arthur Gregory
Dhahran, Saudi Arabia

Strange justice

IF MICROSOFT were truly not guilty, it would be appalled that its appeal was not accepted immediately by the Supreme Court so it could be exonerated quickly ["Microsoft Seeks Five Months for Appeals Filings," *Computerworld.com*, Oct. 6]. It has shown a clear understanding of "justice delayed is justice denied."

Charles J. Lingo
Ponchatoula, La.

All fun and games

OH, THANKS a lot, *Computerworld*, for that QuickStudy on "Easter Eggs" [Technology, Sept. 18]. What, do you suppose, will be the total loss of productivity to businesses around the world as *Computerworld* readers — and all their friends — play Microsoft Word pinball or fly around inside a spreadsheet trying to find the Excel monolith?

Now that I've found the monolith, I had best be getting back to work (just as soon as I e-mail my girlfriend about this). By the way, that pinball game was pathetic!

Jack Kaufman
Senior programmer/analyst
Binghamton, N.Y.

Power for the people

MY BROTHER is an excellent professional truck driver with probably the most difficult driving job in existence: the delivery, without a scratch, of new cars. He's always learning more about how to do his job better. He'd be interested to know of Shawn Button's theories [Readers' Letters, Sept. 11] that he's a mediocrity who owes his position to seniority. The myth that unions are interested only in seniority in place of real skills needs to be laid to rest.

First of all, many union-free data processing shops use seniority in assigning pay and benefits. Lazy personnel practices are alive and well in nonunion companies, especially in more conservative industries. Second, the irrationality of using age appears in many cutting-edge environments in a new form: reverse seniority, in which younger employees are permitted and encouraged to disrupt good practices, at times for the sheer hell of it. Thus, expertise in Visual Basic is thrown overboard because those experts are represented as old fuddy-duddies by media propaganda.

But having said this, I am not convinced that programmers need unions, and I am less convinced that managers like Mr. Button should be in unions. This is because, since 1948, U.S. businesses have enforced, by means of the Taft-Hartley Act, the idea that collective bargaining must restrict itself to pay and benefits. "Management prerogatives" in U.S. workplaces mean that work rules and control of the workplace must, in our society, remain in the hands of management.

The problem is that in a real sense, programmers enforce the actual rules. We need instead to decide that workplaces are not fully private property but that the community, including managers, programmers and union truck drivers, should have a say in the way business is conducted.

Edward G. Nilges
Chicago
spinoza1111@yahoo.com

Here's my two bits

I ENJOYED the Technology QuickStudy on bandwidth [Oct. 2], but I wanted to note that kilobits means 1,000 bits, not 1,024 bits. The latter refers only to computer memory, not transmission speeds.

Michael J. Hammel
Systems development manager
Department of
Game and Inland Fisheries
Richmond, Va.
mhammel@dgif.state.va.us

No offense taken

IN THE Oct. 2 issue, Christine Wagner wonders "if male readers would be offended seeing a man in a G-string selling a router" [Readers' Letters]. This male reader certainly wouldn't; when may I expect the first ad? Paul Hardy wonders if sex sells managed hosting solutions. Maybe not, but it might make a dry newspaper a little more fun. And it did get his attention.

Stan Kerr
Computing
& Communications Services
University of Illinois
Urbana-Champaign
stankerr@uiuc.edu

I WOULD LOVE to see a picture of a man in a G-string selling routers, and I hope *Computerworld* will find an advertiser willing to strike that blow for equal opportunity. For an appropriate fee, I'd pose for the ad myself.

Terry Duke
El Paso, Texas

READERS WHO objected to the DataReturn/Victoria's Secret advertisement have a right to their opinions, but *Computerworld*'s policy seems perfectly sound. Victoria's Secret is a well-respected, ethical retailer. DataReturn was promoting its success in supporting that retailer's Internet marketing efforts. The picture in the advertisement was relevant and in perfectly good taste. You honored your obligation not to censor legitimate advertising. As to Ms. Wagner's question: This male might be bored or amused by "seeing a man in a G-string selling a router," but certainly not offended.

Douglass W. MacLean
CEOEwarenow.com LLC
Nashua, N.H.
dmaclean@ewarenow.com

Alaska Air was there first

THE STORY "U.S Air Installs Kiosks for E-Ticketed Customers" [*Computerworld.com*, Oct. 6] failed to mention that Alaska Air has been using such kiosks for several years.

E-ticketing and kiosk check-in (including baggage) is a normal thing for Alaska Air travelers.

Ed Klein
IS business analyst
Snohomish County
Public Utility District
Everett, Wash.
eaklein@snopud.com

Breakthrough technology enables B2B sooner, for dramatically lower costs. Now you can design a B2B solution in as little as three days, have your prototype operational in three weeks, conduct more than a million transactions per day, and enjoy savings month after month. Those are actual results reported by Attunity customers. Our revolutionary B2B integration software lets you create, share, automate and manage your business processes with customers and suppliers of any size, anywhere—while fully integrating your existing IT systems—and linking you with leading eMarketplaces. Register on our web site to learn how we're easing the way to B2B with companies like Compaq, Future Electronics, Verizon and Nu Horizons. Or call us today at (877) 888-8763.

ATTUNITY
This way to B2B

www.attunity.com/go/u1/

© Attunity Ltd., NASDAQ:ATTU

BUSINESS

WEB AS SAVIOR?

Floor and ceiling maker Armstrong has been struggling financially for the past two years, and its stock has plummeted from $90 per share to less than $6. The company hopes its new Web strategy can save it from disaster, but many analysts say it won't work. ▸ 44

IT'S ANCHORS AWEIGH FOR EDS

Who ever expected to see the largest, most revolutionary information services contract come from the military? The U.S. Navy's recent contract with EDS definitely turned heads. And it may blaze a path for government agencies that want to buy information technology functions but not the IT itself. ▸ 46

LANGUAGE BARRIERS

Germany lags far behind other countries in Internet usage, but analysts predict a boom over the next three years that will more than double the country's Internet-penetration rates. So German companies are now racing to emphasize their broad and deep German-language content before customers are won over by foreign companies. ▸ 48

YOU SEND ME

It's a busy time at Send.com as the company gears up for a holiday site relaunch. But the long hours are worth it because the dot-com puts a high emphasis on its IT staff, says Josh Roman, director of e-commerce applications. ▸ 50

THE LATEST BUZZ

Does your new CEO have the DNA for the job? Thinking about hiring a new VSP? Yup, you guessed it. The buzzwords you've finally mastered have already gone stale. It's time for yet another edition of the techno-speak dictionary. ▸ 55

UNDER THE GUN

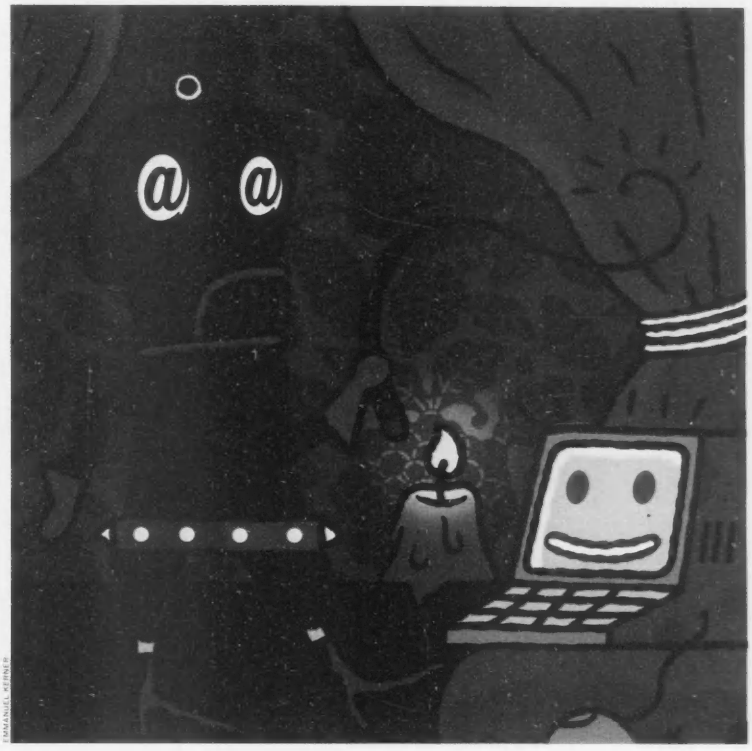
How do you, the new CIO, earn the trust of already skeptical customers? What ideas can you offer to turn around the dire financial picture at your company? *Computerworld* talks with two CIOs — one with a business background, the other with technology experience — about how they would handle various crisis situations. ▸ 56

CIOs WHO GIVE BACK

Stephen Raye is the CIO at GeneralCologne Life Re in Stamford, Conn. He's also a founding board member of a local nonprofit group that makes affordable housing available to the community. And he serves on the Norwalk Community College Information Technology Advisory Council. Raye may be in the minority, but he's not alone. Meet some of the IT world's biggest philanthropists. ▸ 58

MORE

Opinion: Ed Yourdon 50
QuickStudy 62
Advice 64



EMMANUEL KERNER

THE CYBERSPACE UNDERGROUND

HOW WELL DO YOU KNOW that unassuming network administrator in the corner cube? Imagine him returning home from work and changing out of his jeans-and-T-shirt uniform into a leather Goth getup. We take a look inside the world of the hacker underground, where quiet programmers transform themselves into the freedom-fighting radicals of cyberspace.

52

Tile Maker Looks to Web for Lifesaving Jolt

Analysts cast doubts on online strategy

BY TODD R. WEISS

Faced with two years of rough financial performances and tough times in its key flooring and ceiling tile markets, Armstrong World Industries Inc. is hoping the Internet will help improve its health.

The 140-year-old company has spent this year putting together a new Web strategy to help cut production costs, improve its market share and expand its customer base. But analysts say the Web isn't likely to rescue Lancaster, Pa.-based Armstrong from financial woes.

BOUHDARY: "We do see this as a major opportunity"

The problem, said Chris Winham, a financial analyst at The Goldman Sachs Group Inc. in New York, is that Armstrong is "the market leader in a low-growth or no-growth industry — that being vinyl flooring."

Armstrong's financial struggles have shoved its stock into a free fall, plunging from an all-time high of $90 per share in April 1998 to $5.63 per share on Oct. 6. But despite what critics say, the company is determined to use the Internet to reverse that trend.

"We look at [the Internet] as one of the very best opportunities we have to help drive our top lines," said Frank Riddick III, Armstrong's president and chief operating officer.

Beyond changing its Web site, which was launched in 1994, the company is incorporating several core components into its new e-commerce approach, Riddick said.

Armstrong is participating in online marketplaces such as Pittsburgh-based FreeMarkets Inc.'s FreeMarkets.com to buy raw materials at lower prices. In addition, the company has merged its 30 global and departmental Web sites into one, giving visitors a central place to visit and learn about its products.

The company said it also hopes to expand its market by targeting younger shoppers. In researching its Web strategy, the company learned that the Armstrong brand name wasn't well recognized by people younger than 35.

More detailed product specifications will be available to encourage home builders and architects to use Armstrong products. There will also be new tools for professionals to acquire the company's products through competitive bidding marketplaces on industry-connected channels.

"We do see this as a major opportunity for us," said Chakib Bouhdary, the company's vice president of electronic business transformation.

Armstrong has invested at least $8 million in its Web site this year, hiring Proxicom Inc. in Reston, Va., to help create and maintain the new site.

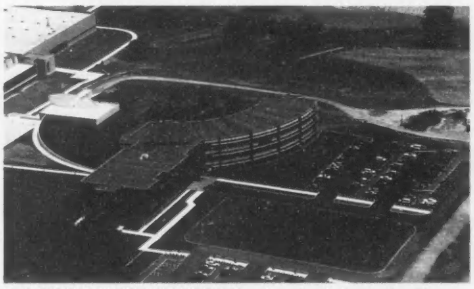
The company has also allied with other companies online, including Redwood City, Calif.-based ImproveNet Inc. Armstrong has a banner link at Improvenet.com, where consumers can get information on home-improvement projects. The link brings about 500 to 700 visitors directly to Armstrong's site each day.

Laurie Orlov, an analyst at Forrester Research Inc. in Cambridge, Mass., said older firms such as Armstrong can "transform" their businesses using well-implemented Web strategies, but the efforts must be well-synchronized with existing sales and marketing channels to be successful.

Freeport, Maine-based retailer L.L. Bean Inc. was able to use the Internet to find a whole new market with younger consumers who prefer to shop online rather than with its catalogs, Orlov said. "There's no reason that Armstrong can't do the same thing," she said.

However, Winham said, putting money into the Internet is "not on the top 10 list of investment drivers in this industry." He added that beyond cost savings, it's difficult to see real benefits to Armstrong's bottom line as a result of using the Web.

Margaret Whelan, a financial analyst at UBS Warburg LLC in New York, said companies don't typically get the leverage they expect from an increased Internet presence.



ARMSTRONG WORLD INDUSTRIES headquarters in Lancaster, Pa.

"I don't think it's the catalyst Armstrong needs to jump-start the company out of the downturn — the funk — it's in right now," Whelan said. ◗

PIMM FOX/VOICE FROM THE VALLEY

Military precision

ARE YOU DOING 10 THINGS at once? If so, you understand how simply scheduling the workday has become a modern business nightmare. So imagine running a major call center, where organizing the schedules of dozens of workers can literally mean the difference between success or failure. Too many people manning the phones and you have a money-bleeding situation; too few, and irate customers will make your life hell.

In an army, the parallel situation would be if troop movements, deployments or job rotations were bollixed up.

Ofer Matan, the chief technical officer and co-founder of Blue Pumpkin Software Inc. in Sunnyvale, Calif., worked on just such a problem for the Israeli army and has applied this intelligence to the ubiquitous world of call centers.

"We have 150 agents answering credit union member questions," says Pamela Treischel, call center manager at The Boeing Co. in Tukwila, Wash., and a user of Blue Pumpkin software.

"We used to use Excel spreadsheets, doing everything by hand," says Treischel. "But with Blue Pumpkin, we were able to use our historical patterns and calls and schedule agents to meet the demand; we're able to set the window." The window of operations, that is.

PIMM FOX is *Computerworld*'s West Coast bureau chief. Contact him at pimm_fox@computerworld.com.

The business world has turned into a battlefront, where military precision and consistency are essential to retaining customers and delivering service. At Boeing's credit union, the call center handles queries from 280,000 members.

"Companies need this capability because they need to be more efficient with their manpower and more precise in dealing with customers," says Matan. True enough, but does the Stanford University Ph.D. believe that this kind of intelligent forecasting is the way to solve these scheduling issues?

"You can take into account specific factors such as work rules, lunch breaks and personal vacations," he says. "In addition, this process understands that certain people are good at certain things, and you can schedule for that. You have control."

I wondered how much further Blue Pumpkin could push the envelope of normal call center operations when I encountered Shane Larimore, the operations supervisor at JetBlue Airways Corp. in Salt Lake City.

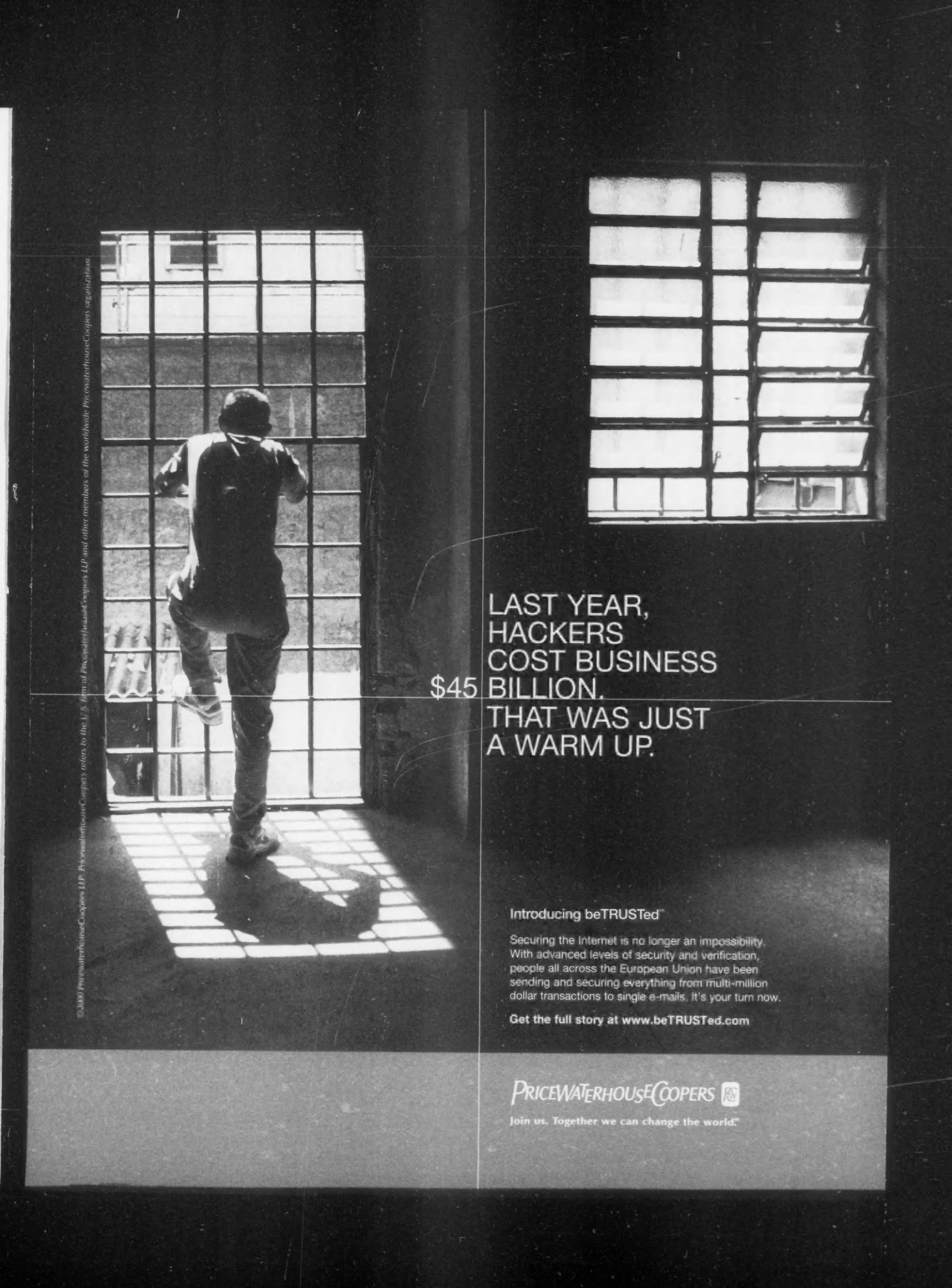
All of Larimore's 222 call agents telecommute. Yes, using Blue Pumpkin, the reservations agents are scattered about at their homes, armed with keyboards, headsets and dial-up connections.

Larimore, who has been working in call centers for five years, most recently at Southwest Airlines, says, "We can forecast call data on any given week and distribute the information to our agents."

By having agents at home, Kew Gardens, N.Y.-based JetBlue is able to reap the benefits of lower costs and lower agent turnover than those big call centers of major airlines.

The airline, which was started early last year with $130 million in venture funding, says it's going with "unprecedented use of technology for ease, safety and efficiency." With fares averaging 65% less than the competition (mainly on the East Coast), clearly not all the technology advances are in the air.

So the next time you find yourself overwhelmed by 10 things to do, tackle the mundane tasks first, with precision and care. After all, soldiers without coordinated schedules can't fight, just as call center agents can't help customers. ◗


LAST YEAR, HACKERS COST BUSINESS $45 BILLION. THAT WAS JUST A WARM UP.
Introducing beTRUSTed™
Securing the Internet is no longer an impossibility. With advanced levels of security and verification, people all across the European Union have been sending and securing everything from multi-million dollar transactions to single e-mails. It's your turn now.
Get the full story at www.beTRUSTed.com
PRICEWATERHOUSECOOPERS
Join us. Together we can change the world.™
©2000 PricewaterhouseCoopers LLP. PricewaterhouseCoopers refers to the U.S. firm of PricewaterhouseCoopers LLP and other members of the worldwide PricewaterhouseCoopers organization.

Navy Deal Sharpens IT Focus

Hiring EDS lets military concentrate on content

BY DAN VERTON

FEW CAPTAINS of industry would point to the federal government as an example of efficiency and ingenuity when it comes to contracting for information technology services. The government is too large, inefficient and beleaguered by red tape to act as a model for anything, or so goes the old argument.

However, things may have changed for the government two weeks ago, when the U.S. Navy awarded Plano, Texas-based Electronic Data Systems Corp. a contract for IT services that has been called the largest and most revolutionary of its kind — inside or outside government.

The five-year, $6.9 billion Navy/Marine Corps Intranet (N/MCI) contract, awarded after an 18-month bidding process, is the largest IT outsourcing pact in history. The contract's additional three-year option could boost its value to more than $9 billion, according to Navy officials.

N/MCI will consolidate more than 200 Navy and Marine Corps networks around the world into a single, more cost-efficient and secure network that will be centrally administered and operated by EDS. From Marines in a foxhole to Navy commanders aboard ships or at bases around the world, N/MCI will give more than 350,000 sailors and Marines the ability to do everything from ordering additional supplies and viewing personnel records to coordinating military operations.

The goal, according to senior Navy officials, was to find a way to purchase IT services as the military does utilities such as telephone or electrical service.

When the Navy started researching N/MCI, it found that it spends about $1.6 billion per year on IT services. However, once the Navy looked at what it would cost to upgrade and refresh all of its hardware, software and infrastructure on its own, that figure surpassed the $3 billion-per-year mark.

"Keeping that organization connected is an extremely expensive proposition," said Navy Secretary Richard Danzig. "We realized that by turning it over to the private contractor, we could refresh that technology readily because we could insist on performance guarantees from the contractor."

So the Navy decided to give industry tacit ownership of its entire IT infrastructure, for which it received a monetary credit for all infrastructure that could be used by EDS as part of N/MCI. That credit is expected to bring the Navy's annual cost down to just $1.2 billion per year, said Danzig.

Although all of the bidders, including Computer Sciences Corp. (CSC) in El Segundo, Calif.; General Dynamics Corp. in Falls Church, Va.; and IBM, offered "strong bids," EDS's offer was deemed to be the best overall value, said Joseph Cipriano, the Navy's program executive officer for N/MCI.

EDS must also meet performance measures established under more than 40 service-level agreements for network performance, latency, security and network downtime, each of which includes incentives and penalties.

For example, performance incentives for keeping the network up and operating correctly could amount to $400 per seat, or up to $150 million per year, said Cipriano. "In order to do that, [the contractor] would have to delight everyone with the service, above the levels that are normally achieved in commercial practice," he said.

The Navy also included incentives for enhanced security that will be based on the time it takes EDS to determine whether someone is trying to break into the network, the time it takes EDS to respond to that intrusion and how the network is affected by the company's response.

The Navy could also terminate the contract and hand the deal over to either CSC or IBM if it isn't satisfied with EDS's performance.

Olga Grkavac, executive vice president of the Enterprise Solutions Division at the Arlington, Va.-based Information Technology Association of America, said N/MCI is a pure example of commercial best practices at work in the government.

"They took the best practices from the commercial sector and applied it to the Navy," said Grkavac. "And they knew they had to go to the commercial sector for that sort of experience."

AT A GLANCE

Military Mission

Contract: Five years, with three option years

Value: $6.9 billion (or $1.2 billion per year); option years could boost total to more than $9 billion

Current Navy spending on IT: $1.6 billion per year

Winning vendor: EDS

Goal: To replace more than 200 disparate networks with one seamless network owned and operated by a commercial vendor

Size: When complete, N/MCI will support 350,000 Navy and Marine Corps users at bases in the U.S., Hawaii and Japan, as well as users aboard Navy ships

Benefits: N/MCI will allow the Navy to buy IT services like it buys electricity from utilities, will enhance security by eliminating network back doors and will give the Navy more control over technology standards and a better view of annual IT budget requirements

WE BUY USED COMPUTER EQUIPMENT

PACE/BUTLER CORPORATION
800-319-9355
Fax: 405-755-1114
http://www.pace-butler.com
13900 N. Harvey Ave.
Edmond, OK 73013-2431

FAST • FAIR • FRIENDLY • Since 1987

Directory of Top Computer Executives
23,000 of the largest IT shops in the U.S. and Canada

IT Managers
Easily find contracts at shops like your own. Create roundtables; share internal classes; and trade secrets, stories, equipment, and expertise.

Sales and Marketing Managers
Stop chasing dead-end leads with inaccurate data. Both hard-copy and electronic versions are available for maximum flexibility. Request our FREE report: "Understanding Computer Industry Demographics for Marketing and Sales Managers."

800-234-2227 www.acrhq.com
20% discount off your first order. Ask for the Dominion Project Office.

SNAPSHOT

Who's Doing the Hiring?

Opportunities will still abound for IT professionals in this year's fourth quarter, according to Menlo Park, Calif.-based RHI Consulting Inc.'s Information Technology Hiring Index. CIOs surveyed said they expect a 21% net increase in IT hiring in the fourth quarter of 2000. The largest hiring increases are expected in the following regions and industries:

REGION	NET INCREASE
New England	31%
Pacific	26%
West South Central	25%
Mountain	24%
West North Central	21%
Mid-Atlantic	20%
East North Central	19%
East South Central	19%
South Atlantic	12%

INDUSTRY	NET INCREASE
Financial services, insurance and real estate	37%
Construction	34%
Manufacturing	21%
Professional services	21%
Retail	21%
Business services	20%
Transportation	20%
Wholesale	11%

Base: 1,400 CIOs at U.S. companies with 100 or more employees

Having Trouble Justifying an ROI for Windows® 2000?

Roll up your sleeves and put us to work.

Even the most seasoned CIO can have difficulty justifying an ROI for Microsoft® Windows 2000 in the board room. But ENTEX IT Service™ can help. Our Windows 2000 Business Justification Study is an independent evaluation service to identify the value and return on investment of Microsoft Windows 2000 to your organization. It is just the kind of help you need to build your Microsoft Windows 2000 business case, determine its ROI and justify the migration.

We can make migrating to Microsoft Windows 2000 easy, efficient and economical with our hands-on approach including strategic planning, design and deployment, and desktop migration.

If you're considering migrating, contact the company that half the Fortune 100 companies rely on every day for insightful distributed computing solutions that provide measurable business benefit.

ENTEX IT Service, providing innovative computing solutions worldwide.

ENTEX® IT Service

A Siemens Company

Creating Value through People™

www.ENTEX.com

Call us at: **877-ENTEX4IT (877-368-3944)** or email: **Win2K@ENTEX.com**

ENTEX, ENTEX IT Service and Creating Value through People are either registered trademarks or trademarks of ENTEX IT Service, Inc. Microsoft and Windows are registered trademarks of Microsoft Corporation.

Germany Lags in Internet Usage but Gears Up for Boom

BY MARK HALL
KARLSRUHE, GERMANY

Mark Twain labeled the German language "awful," but local companies that understand its unique complexity will have an edge over foreign competitors that may not be able to adapt to its daunting syntax and vocabulary in time to compete effectively in Germany's rapidly growing Internet economy.

Matthias Greve, CEO of Web.de, Germany's best-known dot-com, whose portal competes with Yahoo and Lycos and other Web sites targeting affluent Germans, said he believes that by developing "broad and deep" German-language content and offering unique services to the local population, German firms can beat U.S. companies at capturing online business from speakers of German.

Germany lags behind the U.S. and other members of the European Union in getting its citizens online. International Data Corp. (IDC) in Framingham, Mass., estimates that only 24% of German households are connected to the Web. That's less than half the penetration rates of both the U.S. and the Netherlands.

However, IDC also projects that the percentage of Netizens in Germany's population will more than double to 51% in three years. That increase is expected to boost business-to-consumer e-commerce revenue from $4.2 billion today to $15.3 billion by 2003, according to IDC.

Part of Germany's digital dilemma can be tied to the difficulties it faces in dedicating information technology talent to Internet projects, according to the country's economics and technology minister, Siegmar Mosdorf.

To compete with U.S. companies that are exploiting Internet opportunities in his country, Mosdorf said, the German government needs to change regulations covering everything from venture capital investments to importing technical talent from overseas.

Greve said that although his company continues to expand, it's hampered by a dearth of qualified IT professionals. "We could definitely use more C++ programmers," he said.

Next month, Web.de is planning to add application service provider messaging services to its portal for German businesses, said Greve.

AT A GLANCE

Germany Online

- 24% of German households are connected to the Internet – less than half the penetration rates of both the U.S. and the Netherlands.
- Internet usage in Germany is expected to more than double to 51% of the population in three years, according to IDC.
- The increase is expected to boost business-to-consumer e-commerce revenue from $4.2 billion today to $15.3 billion by 2003, according to IDC.

The Hottest Conference This Fall!

STORAGE NETWORKING WORLD®

October 30 – November 1, 2000

Renaissance Orlando Resort • Orlando, Florida

Storage Networking World® – Strategies and Solutions

STORAGE NETWORKING WORLD

Renaissance Orlando Resort

- Storage Networking World®, an alliance between the SNIA and Computerworld, promotes access to the latest information on storage solutions for users, implementers and vendors.
- A conference program featuring industry leaders, exciting panels, informative sessions, analyst updates, tutorials, and a 50-company Interoperability Lab.
- Package includes an Expo (solution showcase), meals, receptions, and a complimentary (for users and implementers) golf outing.
- Optional programs include Technical Tutorial Day and discounted Orlando attraction packages to Sea World®, Walt Disney World®, etc. for attendees and their guests.

Co-owned & Produced by: COMPUTERWORLD SNIA Storage Networking Industry Association

Disney's Lake Buena Vista CC

For more information (including conference agenda) about Storage Networking World® or to register, visit

www.computerworld.com/snw

or call 1-800-883-9090

Attendees of **Storage Networking World®** will see solutions from...

(sponsors listed as of 10/4/00)

PLATINUM SPONSORS:

adic, APC American Power Conversion, BROCADE, Cisco Systems, CNT, Compaq StorageWorks, DataCore Software, DLT Tape, EMC² where information lives, Exabyte, HITACHI Data Systems, hp invent, IBM, NORTEL NETWORKS, sanone, STORABILITY, StorageApps, StorageNetworks, STORAGETEK, Sun, VERITAS, Interoperability Lab Integration Provider, Solution Technology

GOLD SPONSORS:

ALTIRIS, AT&T Solutions, bmc, COMDISCO, CommVault Systems, Computer Associates, CrossStor, gadzoox, HighGround, imation, ITIS, McDATA, NetworkAppliance, net convergence, searchstorage.com, TROIKA, WorldStor

CONTRIBUTING SPONSORS:

3ware, AMDAHL, EDS, INFOSTOR, INTERPHASE, LEGATO, POLARIS, Prisa, SMS, trueSAN, VIXEL, ZERBURIT

WORKSTYLES

What It's Like to Work at . . . Send.com

Interviewee: Josh Roman, director of e-commerce applications
Company: Send.com, a high-end online gift-giving service
Main location: Waltham, Mass.
Tenure: Since November 1998
Number of information technology employees: 30
Number of employees (end users): More than 100
Why such a high ratio of IT staff to end users? "We've found so many ways to use IT to help business outside of the actual [e-commerce] business model – ways to make people more efficient and smarter."
Major IT initiatives: Creating and installing "a completely homegrown content-management system that will allow us to [post and advertise] merchandise much more quickly than in the past"; developing a homegrown customer relationship management and call-center application; enhancing a custom-built extranet that connects the company with its fulfillment merchants nationwide; and relaunching the site, which will feature a new look and new e-commerce applications, in time for the holidays.
Deadline for the site relaunch: Oct. 30
Anticipated holiday traffic: "I can't give actual numbers, but generally, we expect 20 times our normal volume."
What kind of pressure does the relaunch and the holiday season put on the IT staff? "Longer hours and lots of informal meetings in hallways. Some people are working 9 a.m. to 9 p.m., and some are working 10 a.m. to whenever. And we're working weekends."
Are people sleeping in the office? "Not now, but around the launch, we'll probably have one or two people pulling an all-nighter. Starting this week, we're renting hotel rooms for the people who live further away, so they don't have to drive all the way home after a long day."
Must people carry beepers? Cell phones? "Not everyone. I do. . . . Normally, we might get beeped once a week, but around Christmas, the beepers are red hot, because any downtime over the holidays would be fatal."
Any perks for the long workdays? "We provide dinner at the office and have fully stocked refrigerators with juices, snacks and generally a couple of six packs of beer. And we have a big, off-site, post-launch party planned, with a racing car theme."
Favorite IT refreshments: "Fresh Samantha juices and these huge plastic barrels of pretzels."
Favorite stress relievers: Frisbee, "rousing games of Quake III" and Razor scooter races through the corridors. "We've terrorized a few people by coming around a corner too quickly and running into someone with an armful of printouts."
Compensation and bonuses: "Competitive salaries plus stock options. There are occasional performance bonuses, but they're pretty few and far between and usually based on going above and beyond the call of duty."
Career path options: "That s one of the things we're working on. There's definitely an engineering/development track and a project management track, but we're still working out the others."
Employee reviews: A formal annual review and informal quarterly reviews
Dress code: "Shorts and sandals, most days. I have a meeting today, so I'm pretty dressed up in jeans, a dress shirt and a vest."
Little perks: "Discounts on our products, which can be pretty cool when you toss in the exotic-car rentals."
Last companywide/department perk: "A 'Be Sick With Send Day' – a comp day for employees, where we could go to an amusement park, go golfing, go to movies or get free transportation to an outlet mall, on the company."
Would employees feel comfortable e-mailing the CEO, Mike Lannon? "Definitely – he talks to just about everyone."
Quote: "We have a lot of really intelligent people here. This is, by far, the smartest group of people I've ever worked with."

– *Leslie Goff (lgoff@ix.netcom.com)*

ED YOURDON

Long-term thinking

I RECENTLY CONDUCTED a software engineering seminar for a group of experienced, motivated, highly educated software engineers and managers who passionately want to achieve higher levels of productivity and quality at their company. We discussed familiar concepts like object-oriented methodologies, software reuse and requirements management. We also discussed how these concepts fit into the Software Engineering Institute's familiar Capability Maturity Model. But the more we talked, the more obvious it became that the absence of these techniques within their IT organization wasn't the problem and that their problem wouldn't be solved no matter how many "silver-bullet" techniques they introduced.

The *real* problem, quite simply, is the conflict between short-term constraints and long-term benefits. The political reality for software development teams is that they'll be rewarded if they deliver a system that meets most of the users' expectations, without being too far over budget and too far behind schedule. If the latent bugs aren't visible to users and if the system is actually delivered on schedule and *within* budget, they're heroes.

Delivering a high-quality requirements document, one that actually matches what the code does, may elicit a tepid compliment, but *failing* to deliver such a document won't even be noticed — not until months later, when the maintenance programmers try to add an enhancement to the system. All of the "-ilities" associated with software development — portability, flexibility, scalability, reliability, maintainability — are rewarded only to the extent that they have been identified as major acceptance criteria during the project's development phase.

In short, those downstream strengths and weaknesses of the system are ignored when it comes time to parcel out rewards and punishment. We may give them lip service in the IT best-practices initiatives, but in the famous words from the movie *Jerry Maguire*, when it comes time to "show me the money," all that really counts is delivering a more-or-less working system, more or less on schedule. And until that behavior changes, pragmatic project managers will continue optimizing only the short-term benefits for which they're being rewarded.

It's convenient to blame this on today's short-term business mentality — that the short-term IT deliverables are part of the corporate plan to meet this quarter's revenue objectives and this year's profit expectations — so Wall Street won't punish the stock price. But companies *do* know how to account for long-term costs and benefits: That's what capitalization, amortization and depreciation are all about.

We also know that software package vendors charge an annual maintenance fee of 10% to 15% of the initial purchase price of a package. So, we should be able to base our reward/punishment system on the *lifetime* costs of an IT project, rather than on just the first phase of development.

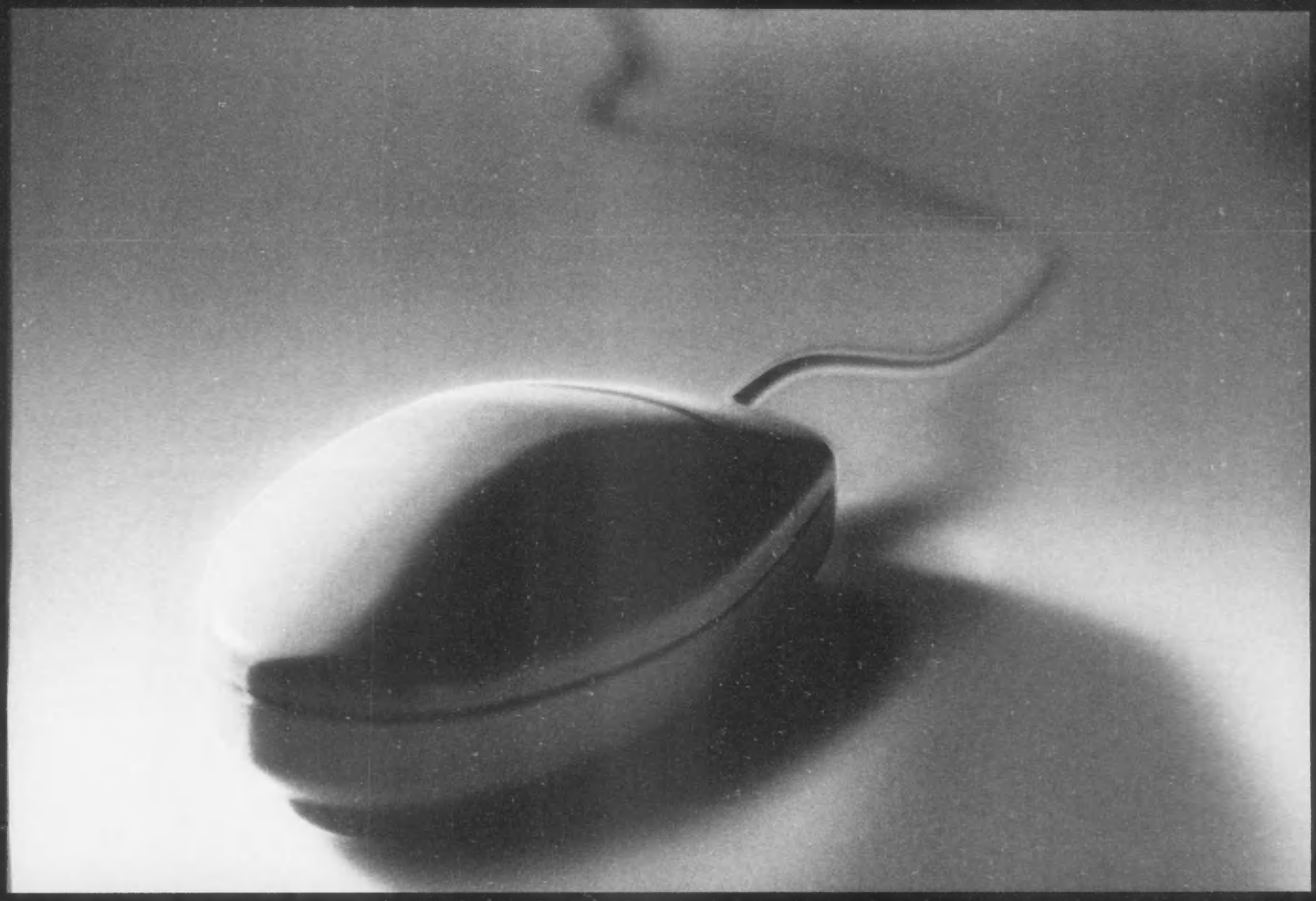
Say a typical IT system has an expected life span of six to seven years. (Yes, many of today's systems have a shorter life span, possibly because they were designed so poorly.) Thus, the initial development cost is only about half the overall lifetime cost. Accordingly, only half of the overall bonus/reward should be issued for meeting the development schedule and budget; it would make more sense to wait until the system has survived the first year or two of maintenance to judge whether its overall lifetime costs will meet expectations.

Prayers aside, IT executives get what they pay for.

If the maintenance department were similarly evaluated, it might be more adamant that the "-ilities" have also been included in the development phase, which would lead to more emphasis on documentation, accurate requirements specifications and all those other Boy Scout principles we teach in software engineering courses.

Realistically, none of this will happen in the average IT organization. Instead, senior IT executives will keep praying for miracles from whatever silver-bullet methodology has captured the IT manager's fancy. But prayers aside, you get what you pay for. And if you only pay for short-term benefits, that's all you'll get.

Yourdon is editor of Cutter IT Journal, *published by Cutter Consortium in Arlington, Mass. Contact him at* www.yourdon.com.



DRAG. DROP. DONE.

THERE, YOU'VE JUST BUILT AN eBUSINESS.

Now there's a fast, easy way to put the "e" in your business. Introducing Aspect® eBusiness Architect, the revolutionary new development tool that takes you from imagination to application... in no time. eBusiness Architect provides a complete menu of pre-compiled, reusable common objects to let you quickly create eFlows: visual representations of your business rules that integrate your multimedia contact center, front- and back-office systems, and future applications into one centrally managed eBusiness. The result: dramatically improved and integrated eCommerce and eCRM capabilities. All without complicated code or costly deployment. Aspect eBusiness Architect. Suddenly, this whole eBusiness thing just clicks.

ASPECT
The Starting Point for eBusiness™

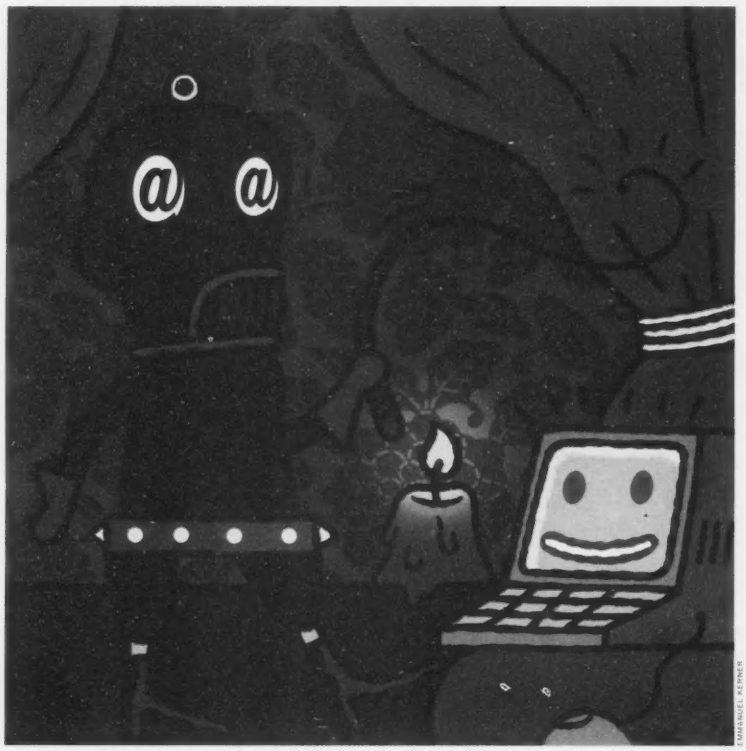
BUILD YOUR eBUSINESS FASTER, SMARTER, CHEAPER.
GET YOUR FREE eBUSINESS ARCHITECT DEMO TODAY.
1-888-412-7728 www.aspect.com/go/cwm

Aspect, the Aspect logo and the phrase "The Starting Point for eBusiness" are trademarks and/or service marks of Aspect Communications Corporation in the United States and/or other countries. © 2000 Aspect Communications Corporation.

1.79

Meet the 'Hactivist'

Welcome to the underground world of a group of computer hackers. They work in IT by day and fight for cyberfreedoms by night. They're also being called today's version of the '60s counterculture. Deborah Radcliff accepted their invitation to see what they're all about.



EMMANUEL KEPNER

YETZER-RA, a 6-foot-3-inch, 300-pound giant of a man, paces between his "subjects" in the smoke-filled Goth club Click + Drag, located in the old meat-packing district of Manhattan.

Inside the club are leather-clad, black-lipped females and young men dressed in women's underwear.

Yetzer's a hacker and an acknowledged "social engineer" with curious nocturnal habits. There are thousands of people like him, who by day are system and network administrators, security analysts and start-up co-founders. When night comes, they transform into vampire wanna-bes, hedonists, Goths, cross-dressers and sado-masochists.

These are the self-proclaimed freedom fighters of cyberspace. They've even got a name for it: hactivism. And political parties and human rights groups are circling around to recruit hactivists into their many causes.

In July, for example, the Libertarian Party set up a table at the HOPE 2000 (Hackers on Planet Earth) conference. The San Francisco-based Electronic Frontier Foundation (EFF) collected donations. And members of civil-rights groups, including the Zapatistas, a Mexican rebel group, spoke up at one of two sessions on hactivism.

But even without such civil-liberties groups trying to organize them, hactivists have been busy on their own. They have formed privacy-related software companies like ZeroKnowledge Systems USA Inc. in Montreal. They're developing anonymous, inexpensive e-mail and Web-hosting services through the DataHaven Project Inc. (*www.dhp.com*). And they're trying to get the Internet out to Third World human rights organizations through groups like Cult of the Dead Cow Communications (cDc; *www.cultdeadcow.com/hacktivismo.html*).

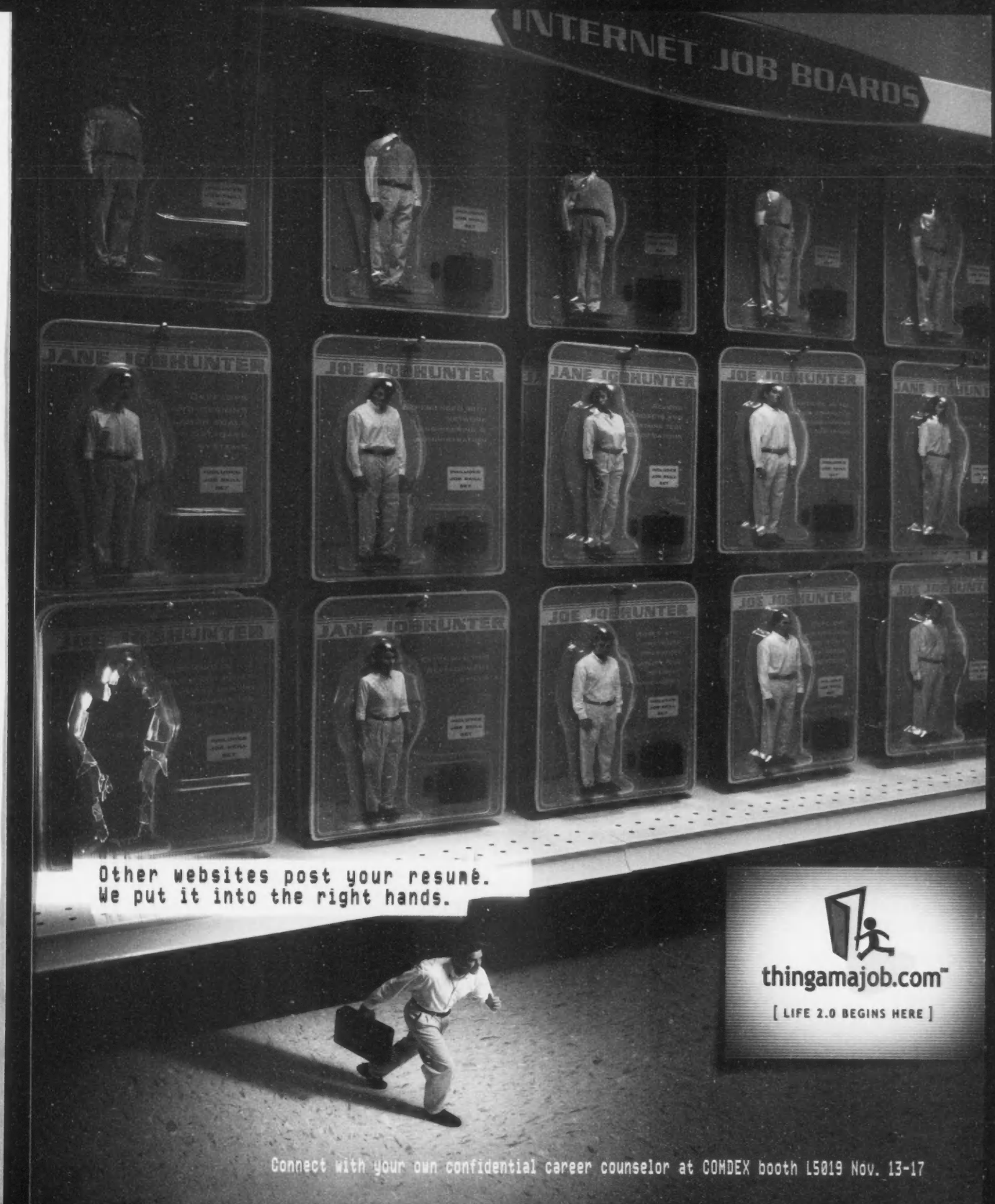
In fact, Yetzer says he feels hactivism's pull so strongly that he makes a dramatic claim: "The Internet is the next Kent State, and we're the ones who are probably going to get shot."

Vietnam Marches to Cyberdisobedience

Like any social engineer, Yetzer exaggerates. Except for the four-year jail terms handed down to Kevin Mitnick and Kevin Poulsen, sentencing for even criminal hacking in the past two years has been relatively light (mostly probation and fines) because of the suspects' young ages.

But the comparison to the psychedelic hippies of the '60s who spoke out against the Vietnam War may not be so far off the mark. Only this time, the hackers are Goths and hedonists. And they're using the Internet to rid the world of tyranny.

Continued on page 54


INTERNET JOB BOARDS
Other websites post your resume.
We put it into the right hands.
thingamajob.com™
[LIFE 2.0 BEGINS HERE]
Connect with your own confidential career counselor at COMDEX booth L5019 Nov. 13-17

"The government tries to put electronic activism into the peg of cyberterrorism and crime with its Infowar eulogies. But E-Hippies, cDc and others aren't criminals. The Internet just multiplies our voice," says Ricardo Dominguez, who edits a Zapatista revolutionary publication and operates the Electronic Disturbance Theater (*www.thing.net/~rdom*).

Dominguez has been working with the Zapatista rebels in Mexico since 1994 to develop nonviolent direct-action tools and spread information about conditions in Chiapas, a mountainous state in southern Mexico, where for the past five years the Zapatistas have clashed with the government.

"I want to bring the net.hacker, net.activist and net.artist into a dialogue about what we can leave to the future for those without a voice and without power — something the Zapatistas can teach us all," Dominguez says.

Another group reaching out to hackers and technologists is the EFF, which last year successfully argued in the infamous Bernstein ruling, which stated that software code is protected as a form of speech.

Robin Gross, the EFF's lead attorney in the case of the Encino, Calif.-based Motion Picture Association of America (MPAA) vs. *2600 Magazine*, an online hacker quarterly, says hackers are naturals for political activism.

"[Hackers] question conventional models. They don't just look at technology and say, 'This is how it works.' They say, 'How can I make it better?' " Gross explains. "They look at society that way too — their government, their schools or their social situation. They say, 'I know how to make this better,' and they go for it."

In the MPAA case, staffers at Middle Island, N.Y.-based 2600 Enterprises Inc. were threatened with imprisonment if they didn't remove a link on the 2600 Web site to the code used to crack DVD encryption. Because the link was editorial content, it sets Yetzer off on another diatribe.

"It's all about greed," Yetzer says, tapping his claw-handled cane on the wooden floor at Click + Drag. "But we have a fundamental right to watch our movies whatever way we want and share our music with who we want."

The Libertarian Party also recruits hackers and technologists. At HOPE, the party's New York State committee (*www.cownow.com*) handed out fliers, signed up recruits and took a "sticker" poll of party affiliations.

"The poll got hacked, but I'd say about half the stickers were yellow — for libertarian, anarchist or independent," says Bonnie Scott, who heads the Libertarians' New York state committee under the hacker handle Rabbit.

According to Scott, many party members are programmers. "We're trying to rally hackers around encryption, privacy and freedom-of-communication planks," she explains. "Hackers can offer us ... freedom, because the Internet routes around tyranny."

But hackers have ways beyond the Internet to electronically spread their message.

Take a young dude named Numeric Overflow, for instance, who late one night broke the lock to a lit-up roadside-construction sign and reprogrammed it to read, "Hack Planet Earth" in support of the *2600 Magazine* staff. But then, he also says he likes to use his reprogrammed garage-door opener to pop open his neighbor's garage doors.

Sounding a lot like Yetzer, Numeric justifies this in the pedantic hacker way. "One of my friend's mothers sees me later and says, 'Oh, don't let that guy come over again,' like I'm some hoodlum or something," Numeric, 21, says. "But isn't it better that I showed them before someone else did it and stole their stuff?"

Growing Up

This moral confusion is typical of the younger hacking crowd. But Stanton McCandish, advocacy director at the EFF, says most of the older hackers (28 years and up) have grown up.

"I saw disillusionment in the mid-1990s, as more bleeding-edge hackers ended up going to jail for cracking. That bummed out their whole theme," McCandish says. "But now they've learned some limits, and they can still operate within them."

That means the older hackers do develop some scruples. For example, McCandish recounts that the EFF Web site (*www.eff.org*) was a popular target of punk hackers back in the mid-'90s, with hacks and defacements occurring weekly. Now, it's been six months since the last attack on the EFF's site, he says. When the site did get hacked, McCandish posted a message about it on *2600*'s bulletin board, and the "hackers who responded called that hacker a lamer," he says.

> [Hackers] don't just look at technology and say, 'This is how it works.' They say, 'How can I make it better?'
>
> ROBIN GROSS, LEAD ATTORNEY, ELECTRONIC FRONTIER FOUNDATION

Get a load of Yetzer's scruples. A Windows NT administrator by day, Yetzer, 28, says he can't stand that his former employer, an East Coast-based Web-hosting firm, lies to its customers.

"My leader, the grand Bruhaha, had this ethical dilemma," he says over the din of technometal music pulsing from Click + Drag's dance floor. "We had this three-hour power failure. When clients called in, I told them the truth: that we'd had a power failure. I got demoted for that. My co-worker told them we got struck by lightning. He got a promotion."

Yetzer later quit without leaving any logic bombs or Back Orifices on the network. "Would serve them right," he says. But Yetzer, the grown-up with scruples, adds, "Of course, if I did anything like that, I'd never work again."

There are even more mature hackers ahead of Yetzer who have grown into heavy hitters in the information technology community. Hackers like Yobie Benjamin, 40, a partner at New York-based Ernst & Young International.

Infamous hackers Mudge, Weld and Hobbit are another example of maturity, having spun off a venture capital-backed consulting services firm called @Stake Inc. in Cambridge, Mass., which now has five offices around the country.

McCandish says this growth process is no different than the hippies who spun off their surfboard and T-shirt shops into big businesses after they grew up.

"The process that turned the dope-smoking hippie of 1968 into the employed investor of 1985 is similarly going on here today," says McCandish. "I just hope that the hippie-to-yuppie disillusionment that took place historically doesn't happen to hackers, too."

In the Eyes of the Law

IAN POYNTER, a 20-year IT veteran who owns Jerboa Inc., an IT consulting firm in Cambridge, Mass., says it's difficult to cast moral judgment on hactivists.

"I don't think hactivism is necessarily good or bad. What they're doing is raising awareness and forcing people to think about things. That's what activists do," he explains. "It's a fuzzy, gray area. Whose morals are we talking about? Who decides them?"

Right now, acceptable morals are determined by the letter of the law, says Jim Christy, a supervisory special agent and counterintelligence coordinator at the U.S. Department of Defense's information-assurance program.

Christy says the authorities don't have any problems with hactivists, as long as they work within the law. But he doesn't condone electronic trespassing, data hijacking or hacking of Web sites, which he likens to protesters breaking windows at the World Trade Organization summit in Seattle in January.

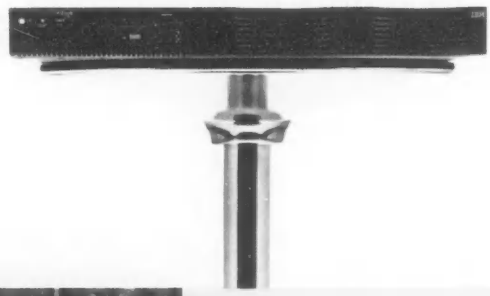
"Laws exist to protect innocent third parties, like those business owners in Seattle who were damaged monetarily," Christy explains. "If the laws don't work, then they should be changed through the political process."

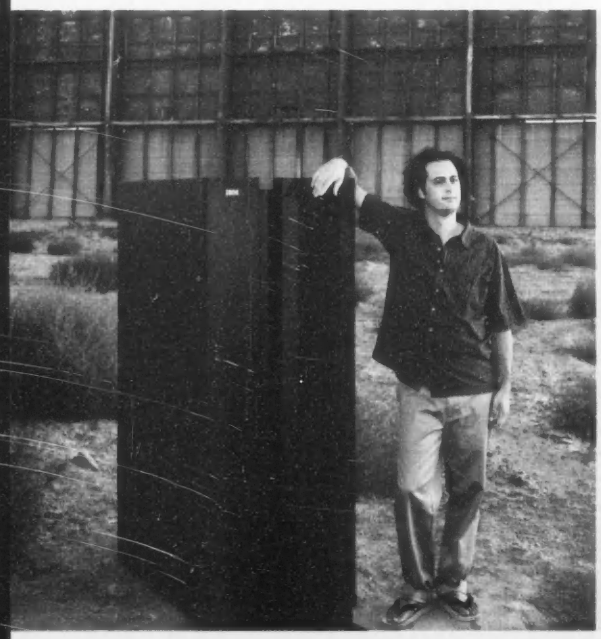
– *Deborah Radcliff*

NEW BANDWIDTH
NEW WIRELESS
NEW STANDARDS
NEW DEMANDS
NEW EXPECTATIONS
NEW WORK
[NEW WORLD]

NEW WORLD
NEW ATTITUDE
NEW SERVERS

[@server]





NEW WORLD

e-business.
First there were stock prices and movie times online.
Then there were new business plans and bold new valuations.
Now, e-business is a part of the basic DNA of every business, regardless of size, industry or sophistication. Not as "Internet foray," but as broad strategic plan. Not in lieu of business principles, but in search of radically new business results. Not as faddish technology, but as basic business infrastructure.
The hype has peaked,
but the meaningful change has just begun.

NEW THINKING

A new world demands new thinking.

New thinking about e-business infrastructure and new thinking about servers—from how they're designed, delivered, integrated and supported to how they are assured in operation.

Why? Because business today means preparing, evaluating and adjusting, every day, for relentless change and unpredictable growth.

In infrastructure, this new world means breaking away from a rigid past of single platforms, closed standards, and integration as an afterthought. It means embracing and championing flexibility and openness, without compromising reliability.

At IBM, it means an entirely new breed of servers, built from the ground up for e-business.

Introducing IBM @server

Servers made possible by new IBM innovations, legendary mainframe-level expertise, acknowledged e-business leadership, and a commitment to create new tools to meet new demands.

This is not about a few more megahertz. This is about new thinking backed up with new actions.

New servers. A new line of best-of-breed servers, covering every platform from Windows® 2000 to UNIX® to Linux.[4] And new enhancements to WebSphere,™ IBM e-business software, to provide web-enabled integration across 35 application environments.

Superior performance. New raw power and cost-effectiveness through IBM science, like the 30% to 40% speed gains of new IBM second-generation copper chips with silicon-on-insulator technology. Proof? The new pSeries 680, which employs both technologies, is the fastest Web server on earth.[1]

Open standards. New IBM servers are built to embrace open standards like Linux, and all of IBM is ready to support Linux. Want the best of both worlds? Match the flexibility, affordability and freedom brought to you by the Linux community with the assurance of IBM service, support and consulting services.

Capacity on demand. Have extra capacity on hand, but don't pay for it until you use it.[2] IBM now offers Capacity Advantage—additional internal processors or even entire servers preinstalled onsite, ready for activation, 24x7, on a pay-as-you-grow basis.

Uptime assurance. High availability services from IBM can help assure uptime performance on new IBM servers, even help assure uptime across applications, networks and entire enterprises.

NEW SCIENCE

Power. IBM just built the world's fastest computer, capable of over 12 trillion calculations/second—enough power to process an online transaction from every man, woman and child on earth in one minute.

Efficiency. IBM Memory eXpansion Technology doubles the capacity of server memory. Soon you can cut memory costs without sacrificing performance, or increase performance at no extra cost.

Maximum Linux. The new z900 server can run thousands of Linux images simultaneously as virtual servers. All for under $500 an image, putting it among the most cost-effective Linux servers in the world.[3]

IBM

NEW SERVERS

IBM @server xSeries

Affordable, Linux-ready, Intel®-based servers with mainframe-inspired reliability technologies.

1U rackable server | up to 2-way Intel Pentium® III processors 1GHz | new cable-chaining technology | up to 4GB memory | integrated service processor | hot-swap drives | Light Path Diagnostics™ | runs Linux, Windows 2000 and Windows NT® | Netfinity® Director™ management software | the x330 starts at $4,426[4] | xSeries models start at $1,413[5]

IBM @server iSeries

Fast implementation, high performance and near-zero maintenance for thousands of ready-to-run business solutions.

Sixth generation 64-bit chips | new copper and SOI technology | up to 16GB memory | up to 4TB disk | hot-plug PCI | 1GB/s high-speed link | enterprise-class Logical Partitioning (LPAR) | 99.9+% reliability out of the box | integrated operating system, middleware, database and communications for high performance and fast ROI | 1-year warranty, 24x7 onsite service | the iSeries 400 Model 820 starts at $34,925[6] | iSeries models start at $10,413[7]

IBM @server pSeries

The most powerful, technologically advanced UNIX servers.

RS64 IV 64-bit processor 600MHz | 16MB L2 cache | 6-,12-,18- or 24-way configurations | up to 873GB hot-swap storage | supports up to 45TB of SSA storage | 4GB SDRAM expandable to 96GB | IBM AIX® operating system, rated #1 by D.H. Brown[8] | the p680 starts at $420,000[9] | pSeries models start at $13,599[10]

IBM @server zSeries

The most reliable, mission-critical data transaction servers on earth.

Designed for up to 99.999% availability[11] (down just 5 minutes/year) | up to 640-way, clustered with up to 2TB memory | integrated cryptographic coprocessors yielding 64,000 SSL/sec.[12] | automatic system resource reallocation | runs z/OS, Linux, S/390® software | HiperSockets @24GB/sec. | workload-based software pricing | under $500 per Linux image[13]

@server™ *For the next generation of e-business.*

IBM®

For more information or to buy direct, go to **ibm.com/**eserver

[1] Based on SPECweb99 benchmark result current as of 9/20/00. See www.spec.org for details. [2] Certain enablement fees may apply. [3] Price claim based on z900 Configuration for Linux ($1,200,000) running 2500 separate instances of Linux. Storage not included. See www.ibm.com/eserver/zseries/linuxconfig for full details on this configuration. [4] IBM list price for xSeries 330 Model 865411Y with 800MHz processor, 256MB memory and open bay, not including hard drive, operating systems or other options. [5] IBM list price for xSeries200 Model 8476-40X with 800MHz processor, 128MB memory and open bay, not including hard drive, operating systems or other options. [6] IBM list price for iSeries 400 Model 820, FC # 2395, uni-processor, 256MB memory and 8.58GB disk. [7] IBM list price for iSeries 400 Model 270, FC #2422, uni-processor, 256MB memory and 8.58GB disk. [8] Rated #1 UNIX operating system: D.H. Brown Operating System Scorecard, 3/24/00. [9] IBM list price for pSeries 680 with 6 processors, 4GB memory and 9.1GB disk and unlimited user license for AIX 4.3.3. [10] Special price available only through ShopIBM for pSeries 640 with POWER3-II 375MHz copper chip, 1-way, 256MB memory, 9.1GB disk and unlimited user license of AIX 4.3.3. [11] Requires available Parallel Sysplex® technology. [12] In a full Parallel Sysplex cluster. [13] Price claim based on z900 Configuration for Linux ($1,200,000) running 2500 separate instances of Linux. Storage not included. See www.ibm.com/eserver/zseries/linuxconfig for full details on this configuration. Actual reseller prices on all systems may vary. List prices, specifications and availability may change without notice. IBM, iSeries, pSeries, zSeries, xSeries, Netfinity, S/390, Parallel Sysplex, AIX, WebSphere, Light Path Diagnostics, Netfinity Director and the e-business logo are trademarks or registered trademarks of International Business Machines Corporation. Lotus and Domino are trademarks or registered trademarks of the Lotus Development Corporation. UNIX is a registered trademark of The Open Group. Java and all Java-related trademarks and logos are trademarks of Sun Microsystems Inc. in the United States and other countries. Windows and Windows NT are registered trademarks of Microsoft Corporation. Intel and Pentium are registered trademarks of Intel Corporation. Linux is a registered trademark of Linus Torvalds. All other companies or products are trademarks or registered trademarks of their respective companies. ©2000 IBM Corporation, All rights reserved.

MASTERING THE NEW TECHNOSPEAK

A quick look at some of the new business-technology buzzwords you didn't know, and why you're glad you do now.

By Melissa Solomon

TIME WAS, there weren't many entries in the technospeak dictionary. *Basic*, the now-obsolete programming language, was tossed around, as was *bulletin board service*, a precursor to the Internet.

Then the '90s hit, and the *World Wide Web* caught on. Shortly thereafter, *FTP* (short for *file transfer protocol*), *HTML*, *URL* and *e-mail* became part of the standard lexicon. Eventually, *e-commerce* joined the fray, with *dot-coms* popping up right and left and *e-retailers* edging in on some of the world's most successful retail chains.

Companies started devoting their time and money toward *enterprise resource planning* implementations that tied *legacy systems* to new *customer relationship management* programs.

But if you think you've mastered technospeak, think again. It's a constantly evolving beast. Some terms are helpful ways of describing the uncharted territory of today's technology. Others are simply catchphrases with shorter shelf lives than the products, services or trends they describe.

Here's a look at some of the new buzzwords making their way around the information technology circuit:

▶ **A-to-A:** OK, so you've heard of *business-to-business* and *business-to-consumer*. But as e-commerce grows more sophisticated, it's becoming abundantly clear that the wave of the future is for anyone to be able to do business with anyone else, hence *A-to-A*. That includes not only business-to-business and business-to-consumer, but consumer-to-consumer, business-to-business-to-consumer, business-to-exchange and of course, with today's tight labor market . . .

▶ **Business-to-employee:** It's a tough-enough job to attract skilled talent these days; keeping your workers satisfied is even more challenging. That's why companies are paying more attention than ever to some of their most important customers — their employees. Sophisticated technology, competitive wages and employee recognition strategies are now given as much weight in many IT shops as customer service.

▶ **Business-process outsourcers (BPO):** Yet another form of application service provider, BPOs offer IT services for automating specific business processes. BPOs can help companies cut the expense of entire departments so they can concentrate their energies on core competencies.

▶ **Collaborative commerce:** Now that anyone can do business with anyone else, a whole new level of cooperation needs to take place. As businesses that have traditionally been competitors start working together, they need to engage in collaborative commerce, which is essentially the lifeblood of online business exchanges. And as companies work together, they need to determine how to facilitate the flow of information needed to make the partnership work.

▶ **DNA:** No, not the stuff used to get wrongfully convicted people off death row. DNA refers to the indefinable characteristic that executives need to make a business fly. The big question on the minds of venture capitalists looking to make a good investment is whether the CIO or CEO has the DNA to do the job.

▶ **Electronic invoice presentment (EIP):** Another term flowing through the business-to-business exchanges on the Web, EIP, simply put, is the same as electronic bill presentment and payment — or billing and accepting payments online. The difference is that EIP is specifically for business-to-business transactions.

▶ **Flies:** You know them: the people who spend hours glued to their computers viewing ads so they can rack up the "rewards." Flies are sucked into the Web by those clever marketing strategies that offer free points, coupons and credit toward merchandise.

▶ **Internet application integration:** One strategy for implementing collaborative-commerce practices is Internet application integration. This allows companies that partner in a supply chain to automate cross-enterprise business processes by linking their different software applications over the Internet. It takes enterprise application integration to a whole new level.

▶ **M-commerce:** Now that you're starting to figure out the intricacies of e-commerce, it's time to move on to new challenges. M-commerce, or m-business, refers to the next major revolution — mobile computing.

▶ **Pervasive computing:** Yes, this term has been around for a while. But as companies move toward m-commerce, pervasive computing is moving closer to reality than ever before. Essentially, it means that computing will be everywhere and play a role in even the most basic human tasks. Many consumers already use their computers to do their grocery shopping and pay bills, but technology will touch just about every aspect of our lives as computers become more portable and accessible.

▶ **Trade credits:** Yet another business-to-business-specific term. Trade credits are a new form of online financing specifically geared toward business-to-business exchanges.

▶ **Voice service providers:** Sure, you can hire an application service provider to handle your systems. But as businesses become around-the-clock operations, employees need to be reached anytime, anywhere. Voice service providers offer a single phone number that's tied into someone's voice, fax, cell and pager numbers. But don't call them VSPs, because that refers to . . .

▶ **Vertical service providers (VSP):** These are industry-specific application service providers. VSPs offer IT services with special expertise in, say, the automotive or health care industry.

▶ **Wireless Markup Language (WML):** As wireless technology gains speed, WML is quickly replacing the standard Internet programming language, HTML. WML allows users to retrieve and display files for Wireless Application Protocol-based phones. ◗

ON THE SPOT

Two IT leaders describe how they would tackle six hypothetical management challenges.

By Julia King and Kathleen Melymuka

EVER NOTICE how some executives flourish when they're suddenly faced with a crisis situation, while others seem to get that deer-in-the-headlights look about them?

In an admittedly unscientific personality test, *Computerworld* posed six hypothetical management challenges to two information technology leaders who have climbed to the top ranks at Fortune 200 companies: Bruce Freeman, CIO at Fort Worth, Texas-based Burlington Northern Santa Fe Corp., who has a business background, and Steve Finnerty, CIO at Northfield, Ill.-based Kraft Foods Inc. (the North American food business of Philip Morris Cos.), who has risen through the technology ranks.

You have a new CEO; what are your top three priorities?

■ **Freeman:** First off, I'd want to find out their agenda, for the short term and the long term. Then, I'd develop a customized value proposition that would match up against his or her priorities pretty quickly. I'd use that to sell myself and my department. [The new CEO] probably wants to do something that shows early on that he's the right person for the position. There's no better enabler than IT to help do that.

■ **Finnerty:** First, you want to establish a personal relationship with that person. I'd start out with a discussion of what [he's] trying to accomplish. In that discussion, you get to know that person and their style and establish rapport. But to sustain that rapport you have to deliver results. You need to determine what his or her priorities are, then go back and develop and communicate your plan to achieve those objectives and those priorities.

Your people are deserting you like rats from a sinking ship. You get the feeling it's more than just the normal turnover. What do you do?

■ **Freeman:** You've got to pretty quickly stop the bleeding and assess what's going on. I'd get into the department and ask them point-blank what is happening and what do we need to do to fix it. My attrition rate is not that high — 8% or 9% — but I'm still losing people I didn't think I would lose. The second thing is to figure out what you can change. It's not all [about] the pay. It's challenge, opportunity, a chance for growth, culture, leadership and money. Because we're part of a railroad [company], I know I have challenges in pay structure. We have a multitiered pay structure with bonuses and stock options. But you talk to 23-year-olds, and they don't care about stock options. They want to buy that new car right now.

> **It's not all [about] the pay. It's challenge, opportunity, a chance for growth, culture, leadership and money.**
>
> BRUCE FREEMAN, CIO, BURLINGTON NORTHERN SANTA FE CORP.

■ **Finnerty:** First, listen to people. I'd do one-on-ones across the organization and in small groups and find out the barriers to their being successful and also what are we doing right. I'd answer the concerns very quickly with a plan: 'I heard you; here's what we're planning to do.' You also need to develop and communicate the vision of where we're going so people have a sense of purpose.

You're an imported CIO with no track record, but your users/customers hate, mistrust and vilify IT based on the performance of the previous CIO and his shop. How do you turn this around and establish a good working relationship?

■ **Freeman:** First, be humble. Don't go in with all the answers. Go in and be a good listener. Find out why they hate IT, what IT didn't do for them. Did IT not give them a PC or not follow their directions? Find out the issues to change the relationship. Then I'd try to adapt and build a plan they'd buy into as a good opportunity to make them successful.

Another point is that you got probably just as big an issue behind the scenes because [the IT] staff has the same feelings and concerns about what is this guy going to do differently. You've also got to sell yourself to your department and buffer them from being beat up as they were previously.

■ **Finnerty:** I would have one-on-ones with leaders of the organization. I'd listen very intently to their issues and get a sense of their priorities. . . . You need to communicate a lot in terms of managing expectations about what's possible. You can't just talk a good game; you have to deliver results.

You have a multimillion-dollar business/IT project that's six months late and out of control. The CEO is breathing down your neck. A competitor has just gone live with a similar project. How do you get the project back on track?

■ **Freeman:** First thing is you've got to listen. You've got to identify the issues quick, then demonstrate a change of direction and correction. If I walked into a project like that and started talking to the programmers, I'd get strong opinions about what the problems are — things like not enough people or working too many hours. You're not looking to have a witch hunt or make a scapegoat, but you have to demonstrate to your staff and your customers that you're going to change the situation. . . . If you do that quickly, you build a level of support with people who have been banging their heads against the wall.

■ **Finnerty:** I have a leadership issue either from the IS or the business process side. Do I need to make a change? Then I would focus on the critical: Cut back on deliverables and get the 20% [of function] that delivers the 80% [of the benefits]. I'd also apply Project Management 101: a plan, resources, know your deliverables and track along.

Your company has just recorded its third straight quarter of disappointing financial results. All department heads are expected to arrive at the next executive council meeting with at least three surefire ideas for either revenue improvements or cost cuts of 20% to 30% that are achievable within a

year. What are your suggestions and how would you pitch them?

■ **Freeman:** The first thing I'd do is try to get myself last on the agenda. Before the meeting, I'd meet with all of the other department heads to find out their three things. I'd want to understand their initiatives, then bring IT in as a means of accomplishing their goals. I've never been in a situation where another department head with an idea to grow revenue or cut costs hasn't required technology. In these situations, I've sometimes gotten added funding because of another department head's idea. As an absolute worst case, I'd rank and prioritize projects and reduce head count.

■ **Finnerty:** I think the first thing is you need to accept the reality of the situation. So I'd do that, put a business hat on and think from a technology and business perspective. I'd get a sense of how long this is going to last. If there's a fundamental long-term problem, I'd react differently than if it's a temporary downturn in the market. If it's temporary, I'd delay some things. If it's a fundamental change, you say, 'This is an opportunity to challenge old paradigms and come up with some creative ideas.'

I'd be quick to partner with the business-process people to be sure we were in alignment. They might want to work creatively to surface some business-process ideas.

I'd discuss this all with the CEO ahead of time if I could and give him or her options and recommendations. Then you need to come in realizing that things may move because there will be new discussion and ideas. So you need to know where you can move [compromise] and where you can't.

You're thinking about taking early retirement, but then along comes an offer you just can't refuse. What's that offer, and why can't you pass it up?

■ **Freeman:** Two things would keep me from retirement. I'd be interested in taking on a leadership role in a start-up company, which wouldn't necessarily have to be a dot-com. The CIO-for-hire role in a turnaround situation would also be interesting.

■ **Finnerty:** I view opportunities by saying, 'What's my purpose in life? Why am I here? What are the values and principles I follow from a life perspective?' I use a river analogy: The Mississippi has a purpose — to get to the Gulf of Mexico. The vision is the Gulf; the principles and values are the banks of the river. One of the principles, clearly, is life balance. When you go outside the banks, you flood the farmland. When you're in the flow, and an opportunity comes along, you say, 'How does that fit to my life purpose — what I'm trying to do or become?' Intuitively, it's obvious whether it's a right thing to do. ◗

■ **BRUCE FREEMAN, 50,** is vice president and CIO at Burlington Northern Santa Fe in Fort Worth, Texas. His previous positions range from project manager to vice president of applications development, a post in which he was responsible for all business and technology planning surrounding the merger of the Burlington Northern and Santa Fe railroads

■ **STEVE FINNERTY, 51,** is vice president and CIO at Kraft Foods in Northfield, Ill. Finnerty, who previously served as Kraft's chief technology officer, was formerly vice president of information systems and supply-chain management at J. M. Huber Corp. in Edison, N.J., and director of information systems at Johnson Controls Inc. in Milwaukee

IT'S GOOD CITIZENS

Career payoffs have been very good to the majority of technologists in recent years. For many, that has fueled a desire to put their skills and experiences to work where they can really do some good – their own communities. By Jill Vitiello

CHERRY KIM

TECHNOLOGY TITANS are making headlines with the fabulous sums they're donating to charity.

Bill and Melinda Gates' foundation has contributed $22 billion to international children's health agencies.

Oracle Chairman Larry Ellison has promised $100 million to help computerize American schoolrooms.

Patrick J. McGovern, founder and chairman of International Data Group, the owner of *Computerworld*, was cited in *Time* magazine as the seventh most generous philanthropist in the U.S., with donations and pledges of $350 million.

While most information technology professionals don't share their vast wealth, many share the megadonors' generosity of spirit and give what they can to make the world a better place. Meet four IT professionals whose neighborhoods are richer because they donate their time and talent.

■ DON SUNDERLAND

CIO
Edison Schools Inc.
New York

Every other Friday for several years, Don Sunderland would leave the office a little early — with his boss's blessings — and hurry uptown with his guitar. He wasn't auditioning for Britney Spears' band. He was leading sing-alongs at the Manhattan School for Children, an alternative public school on the Upper West Side. He and his wife, Ruth, are among the school's founding families.

"We loved the cultural and ethnic diversity of the West Side, but we couldn't help but note that the preschool our children were in looked as if we were in Westchester," says Sunderland, referring to the mostly suburban county just north of New York.

Determined to create a "true neighborhood school" with a mix of black, Hispanic and white children, a group of parents worked with the New York City public school system to launch the Manhattan School for Children's kindergarten and first grade in 1992. The school has since expanded up to the eighth grade. Located on West 93rd Street, it's now known as Public School 333.

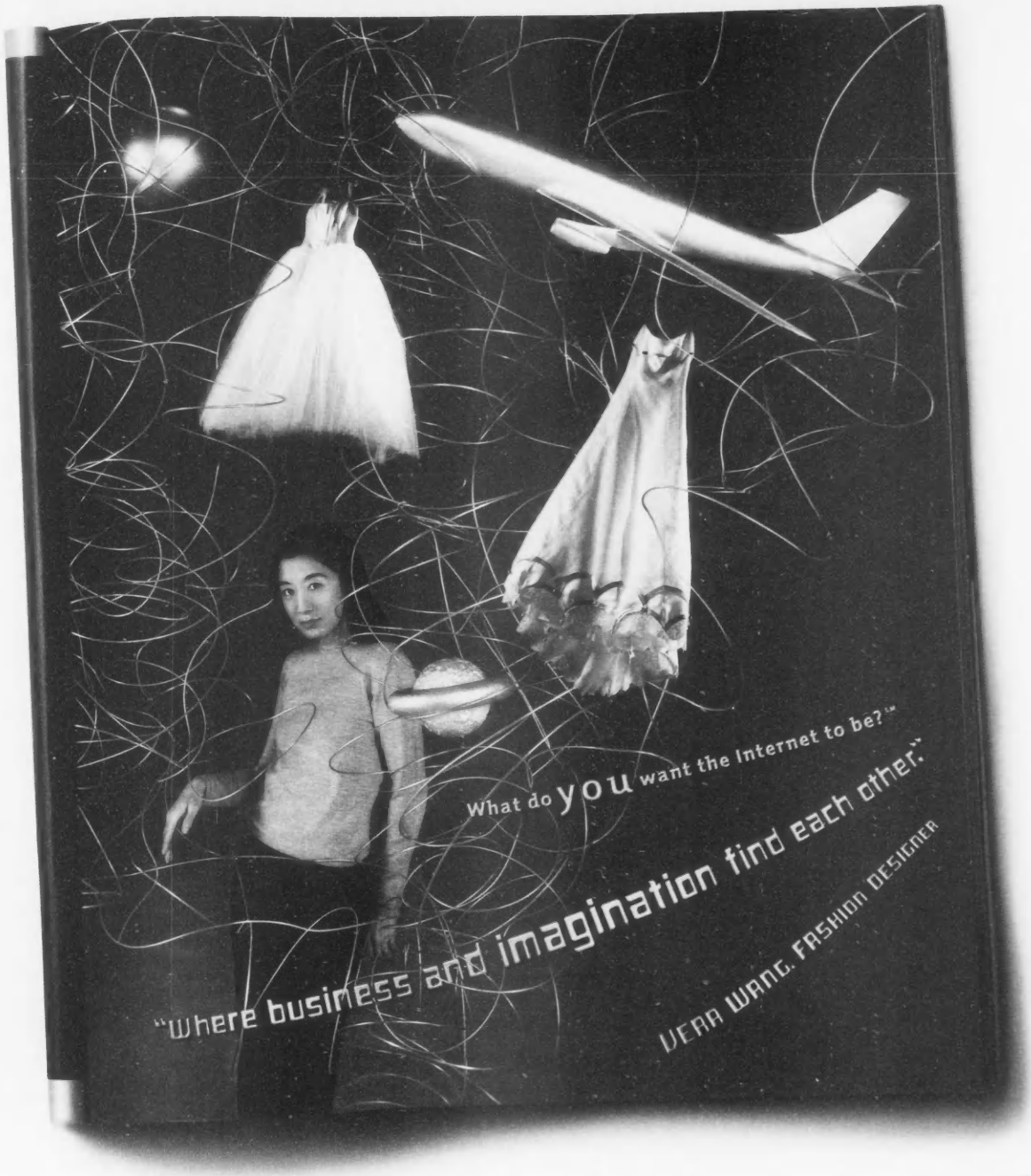
Formerly the head of technology at a Wall Street firm, Sunderland could have afforded to send his children to private school. He says he didn't want to.

"I believe that public education is the American dream, the dream of immigrants that their children will receive the rights of passage to better lives through education. Anything that takes money out of public education and redirects it to private education has class distinction associated with it and penalizes those who are at a socioeconomic disadvantage," says Sunderland.

That passion led Sunderland to accept his current position as CIO of Edison Schools. Founded in 1992 as The Edison Project, Edison Schools is the country's leading private manager of public schools. Many

Continued on page 60

◄ WILLIAM SCHWAB, president of Norwalk Community College, hails its IT Advisory Council



eBusiness

And live happily ever after, we might add. Because we're taking eBusiness to a whole new level. With Nortel Networks™ Clarify™, a portfolio of customer relationship solutions that enables businesses to integrate their sales, marketing and service capabilities with the new, high-performance Internet. Combining data and telephony networks into one Unified Network. And using every point of customer interaction from your Web site to call centers to data centers to create stronger, more profitable and longer-lasting customer relationships. Just one more way we're evolving eBusiness into the way you do business every day. So come together, right now with Nortel Networks. And make the Internet whatever you want it to be. **nortelnetworks.com**

NORTEL NETWORKS

Nortel Networks, Unified Networks, Clarify, the Nortel Networks logo, and the Globemark are trademarks of Nortel Networks. "What do you want the Internet to be?" is a service mark of Nortel Networks.
©2000 Nortel Networks. All rights reserved.

of the schools Edison manages were underperforming before the company stepped in to rebuild them around a strong academic program, applied technology and an emphasis on parental involvement.

Edison has implemented its school design in more than 80 public and charter schools, which it operates under management contracts with local school districts and charter school boards. Each Edison school consists of small schools within schools, called "academies." The concept is similar to the one used at the Manhattan School for Children.

In Edison schools, technology is integrated into the curriculum. Every student, teacher, principal and administrator has easy access to classroom computers, video cameras, televisions and more. Every family with a student in the third grade or higher receives technology to use at home, and every teacher receives his own laptop computer.

In his involvement as a founding family member, past treasurer and parent of kids at the Manhattan School for Children, Sunderland says, "I learned the battles of opening schools and dealing with public education in an inner-city setting, and that very much applies to what we encounter at Edison."

■ STEPHEN RAYE
CIO
GeneralCologne Life Re of America
Stamford, Conn.
Stephen Raye knows firsthand that "Stamford is not all 4-acre zoning." In a region of the country that most Americans view as wealthy, Raye has found opportunities to support those in the community who must work two jobs to make ends meet.

Raye is a founding board member of the Mutual Housing Association of Southwest Connecticut in Stamford, a nonprofit organization created to provide affordable housing for people who are willing to commit themselves to ongoing community improvement tasks such as making repairs on buildings or cleaning up trash. As part of his involvement, Raye has walked the nightly crime patrol in the neighborhoods he helped establish.

"As a CIO, the skills you need are communication, relationship management and the ability to listen," says Raye. "That was what was needed at the Mutual Housing Association. We had a list of people who wanted housing that was longer than the list of the housing available. We created policies and procedures that would qualify people for the housing on an equitable basis."

In addition, Raye has served for more than two years on the Norwalk, Conn.-based Norwalk Community College (NCC) Information Technology Advisory Council. The council advises the two-year college on its curriculum, infrastructure and industry trends.

"Norwalk Community College is very aggressive in its mission of providing a world-class facility to educate and train IT professionals," says Raye. He says he appreciates the chance to serve on the IT Advisory Council, where he can help "fine-tune the IT programs, which provide us with talented IT interns and full-time employees."

When the college was planning a new building, Raye invited those in charge of the project to visit his company and examine its IT infrastructure so they could get a firsthand look at industry best practices. Raye also hired one of NCC's nontraditional students — a woman who had previously earned a math degree and was returning to the workplace and learning computer skills at NCC after raising her children.

"The members of the IT Advisory Council are absolutely the best group of people I've ever worked with," says William Schwab, president of NCC. "They keep us on task and give us such good advice."

■ WILLIAM WEBSTER
Vice president, information management — consumer
Bristol-Myers Squibb Co.
Stamford, Conn.
Another member of NCC's IT Advisory Council is William Webster, who has served slightly less than a year. Bristol-Myers Squibb has hired NCC students for internship programs. "Community colleges address a portion of the population that aren't addressed by state four-year colleges and private universities," he says. "I feel good about helping young people get an education that immediately can be used in their life's work."

To that end, Webster is also working to establish a chapter of the Chicago-based Society of Information Management (SIM) in the area of Westchester County, N.Y., and Fairfield County, Conn. The SIM chapter founders will hold organizational meetings through this year, with the intention of launching the first general session in January.

"SIM helps groom the next level of executives who will take over our functions," Webster says.

■ GINA POTENZA
Manager of technical infrastructure
Lincoln Life and Annuity Company of New York
Syracuse, N.Y.
Gina Potenza is an official wish-granter. As a specially trained member of the central New York chapter of the Phoenix-based Make-A-Wish Foundation of America, Potenza is authorized to fulfill the desires of critically ill children in her community. The whole point is to focus the family's attention on having fun together instead of on the disease that threatens the child's life, Potenza says.

"The first wish I granted was for a little girl with lupus who loves Rosie O'Donnell and wanted to meet her," says Potenza.

Not only did Potenza make the youngster's wish come true, but she also embellished it. Potenza arranged for the girl's entire family to spend a week in New York. A limousine took them to the airport, and the kids received backpacks stuffed with goodies and games to keep them occupied during the flight and cameras and notebooks to record their adventure.

They met the popular comedian and talk show host backstage and were members of the audience through two tapings of her TV show. The family visited tourist spots such as the Empire State Building and the Statue of Liberty. The entire wish fulfillment was paid for by the foundation. "There is no monetary limit on a wish, and the average wish is $5,000, since we enhance them so much," says Potenza, who also serves on the chapter's fund-raising committee.

Two years ago, Potenza decided to put feet to her desire to give back to her community. She asked the advice of a senior manager at Lincoln Life and Annuity who was known for her volunteerism. The mentor helped Potenza identify organizations in the community that were involved in helping children.

"When you contact an organization to offer your services as a tech-support person — or in any other capacity — people will be more than happy to accept your offer of help," says Potenza. One of her first volunteer activities was to provide networking advice to a nonprofit association.

Potenza's love of kids eventually led her to the Make-A-Wish Foundation and to her community's Junior Achievement program, where she teaches second-graders about their community. Her employer gives her a couple of hours out of the office for the five-week course she teaches once a year.

"I get a lot of support from Lincoln," says Potenza, vice chairwoman of the company's charitable-giving committee, which provides grants to Syracuse nonprofit organizations involved with the arts, education and human services. ◗

Vitiello is a freelance writer in East Brunswick, N.J.

Getting Started

STEP ONE: Meet new people.
"When you get out of the meeting room or the tech room and get into the community, you meet the most incredible people in your life," says Don Sunderland, CIO of Edison Schools.

As a volunteer at the Manhattan School for Children, Sunderland didn't install or support the school's computer systems. His Unix background didn't mesh with the "Macintosh orientation" of the education community.

"We run across the same issues at Edison Schools," Sunderland says. "The idea of considering alternative platforms is divisive. I got over arguing about it years ago. We put up the technology that works for the job we have to do." Edison Schools recently struck a deal with IBM to roll out desktops and infrastructure to dozens of U.S. schools.

STEP TWO: Start slowly.
"Sit on a committee to understand how a nonprofit organization works and then take on more responsibility as you learn," says Gina Potenza, manager of technical infrastructure at Lincoln Life and Annuity Company of New York.

Potenza started by offering her technical expertise to area nonprofit organizations and then increased her volunteer activities to allow her the chance to work with kids and to work on and lead teams. "Once you begin as a volunteer, it motivates you to do more," she says. She brought the management experience she gained serving on a volunteer committee back to her job, where she was promoted from systems administrator to manager of technical infrastructure.

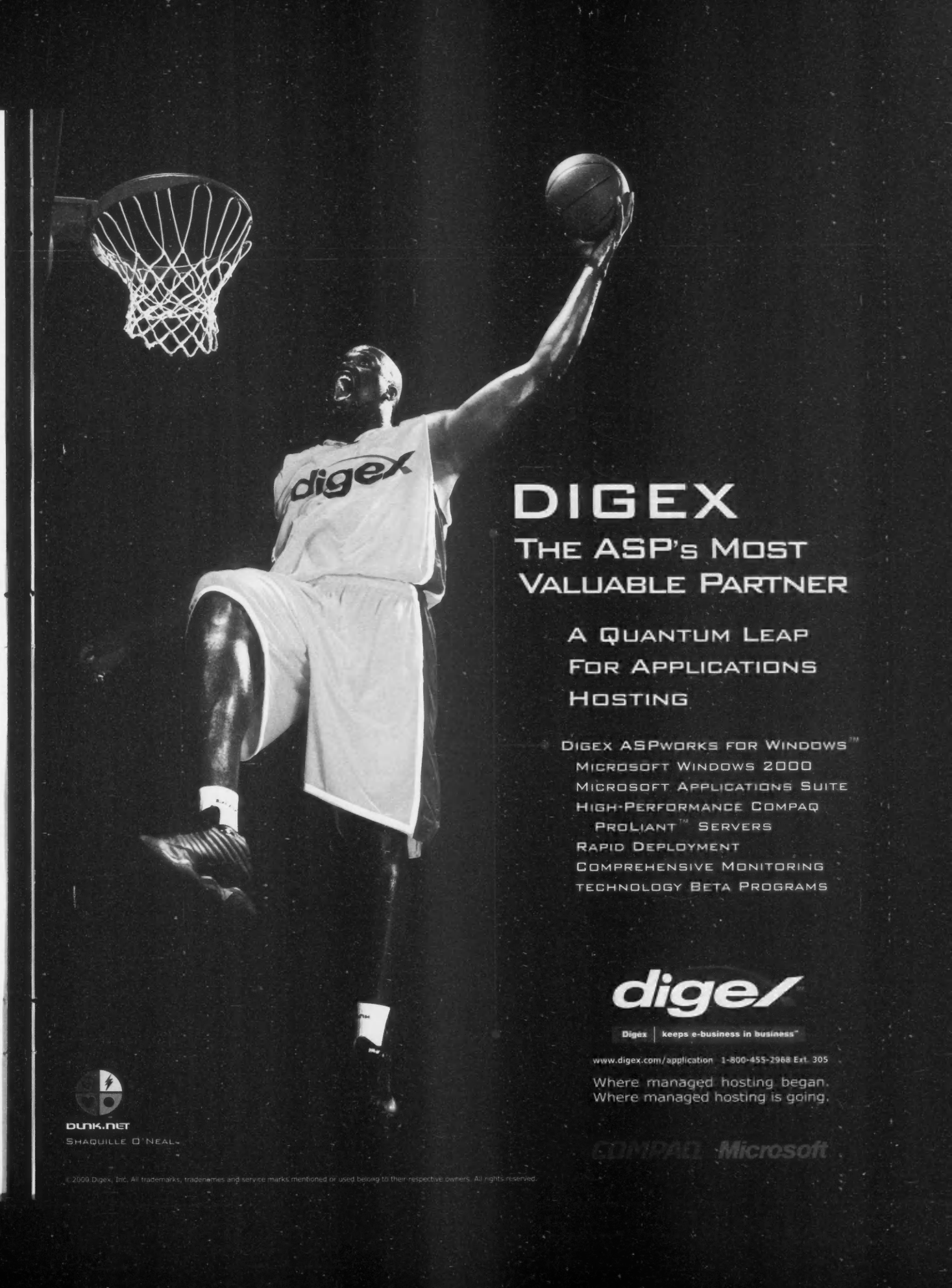
STEP THREE: Give what you can.
"Don't think you have to give your volunteer activities the same number of hours you give your career. Even a small number of volunteer hours can make a big difference to the community or nonprofit association. Slice off some time from your schedule here and there and it pays off," says Steve Raye, CIO at GeneralCologne Life Re of America.

Smart Companies Support Volunteerism

A CIO leading a sing-along. An infrastructure manager playing fairy godmother. Another CIO patrolling a city neighborhood. Nice for them and nice for the people they help, but what's in it for their companies?

Plenty, according to a survey of more than 2,700 U.S. companies conducted last year by The Points of Light Foundation and The Conference Board.

94% of executives responding to the survey said they agree that volunteerism improves a company's public image.
93% said they agree that volunteerism builds employee teamwork skills.
74% said they agree that volunteerism increases employee productivity.



DIGEX

THE ASP's MOST VALUABLE PARTNER

A QUANTUM LEAP FOR APPLICATIONS HOSTING

DIGEX ASPWORKS FOR WINDOWS™
MICROSOFT WINDOWS 2000
MICROSOFT APPLICATIONS SUITE
HIGH-PERFORMANCE COMPAQ PROLIANT™ SERVERS
RAPID DEPLOYMENT
COMPREHENSIVE MONITORING
TECHNOLOGY BETA PROGRAMS

digex

Digex | keeps e-business in business™

www.digex.com/application 1-800-455-2968 Ext. 305

Where managed hosting began.
Where managed hosting is going.

COMPAQ Microsoft

DUNK.NET
SHAQUILLE O'NEAL

© 2000 Digex, Inc. All trademarks, tradenames and service marks mentioned or used belong to their respective owners. All rights reserved.

Capital Assets

BY PIMM FOX

THE IMPORTANCE of understanding what capital assets are and how they're applicable to your organization can be summed up in four words: the Internal Revenue Service.

How you allocate your information technology budget can depend heavily on how an asset is taxed. And determining whether to buy or lease an asset often depends on how it will be treated for tax purposes.

"An asset that does not have a life of more than one year can be treated as an expense and deducted immediately from a company's income," says Howard K. Warshaw, a partner at New York-based accounting firm Leipziger & Breskin LLP. "These items might include office supplies — the point here is that you can immediately expense these items."

Another way to look at a capital asset: "It is anything not held for sale in the business," says Joseph Clare, a partner at San Francisco accounting firm Clare, Chapman, Storey & Castro LLP.

DEFINITION

Sometimes known as fixed assets, **capital assets** generally are equipment or other items owned by an organization that have a useful life of more than one year. Capital assets include machinery, computer hardware and office furniture.

Everyone wants to manage big expenditures, to smooth out the big capital outlays to avoid big blips in cash flow.

JOSEPH CLARE, PARTNER, CLARE, CHAPMAN, STOREY & CASTRO LLP

Depreciating Disk Drives

Capital assets, such as a mainframe computer or a $10 million storage silo, are typically depreciated over several years instead of expensed as an up-front, one-time charge. Using various depreciation methods, companies can write off the cost of the asset following a schedule produced by the IRS.

For example, the IRS says computers can be depreciated over five years, whereas software purchased separately from the computer can be written off over a three-year period. If you can't separate the software from the hardware, then you must select the five-year schedule, according to IRS regulations.

Rules exist for depreciating different kinds of assets for tax purposes, says Warshaw. Most accountants will use the Modified Accelerated Cost Recovery System, which tells you how to depreciate different pieces of equipment, as some have longer lives than others.

Typically, computers are depreciated using what's known as the "double-declining balance" over five years. This is an accelerated method of depreciation that "allows you to write off a higher percentage of the cost in the beginning," notes Warshaw.

Being able to write off a larger portion of an asset earlier in its life can have several effects: It can reduce the amount of income on which the company must pay tax. In addition, by writing off an asset early, your balance sheet isn't full of assets that aren't generating cash flow. But what if you decide you want to get rid of the computers before the five years are up?

"If you paid $1,000 for the machine, and you already depreciated $600 of it after two years and then sold it for $400, you would be able to recognize a loss of $600 against your income," explains Warshaw.

In this case, you get the write-off against income using depreciation and you get to deduct the loss of $600 against ordinary income, thereby lowering the amount that's taxed.

Trying to define the exact nature of an asset can get a little tricky if your company is selling capital assets and claiming a loss.

"Some people look to lease certain assets," says Warshaw. "When [you] are signing a lease for tax purposes, the IRS has certain rules as to whether you can expense the lease payment each month."

Of course, the IRS is interested in knowing whether your company is using a lease to purchase something in order to get the interest deduction. One way to make this clear is to have a portion of the contract state that your business can purchase the equipment for fair market price at the end of the lease.

Attempting to buy the equipment for the nominal sum of $1 won't fly with the IRS. The agency will most likely claim that you purchased the equipment and must depreciate its value rather than deduct the payments.

Maximizing Cash Flows

Another reason to consider leasing equipment is the Holy Grail of cash flow. "Most businesspeople, as well as Wall Street analysts, look for a steady cash outflow from a capital asset," says Clare.

"Everyone wants to manage big expenditures, to smooth out the big capital outlays to avoid big blips in cash flow," Clare adds. "From an economic basis, it could be better for the company. For an IT manager, his or her job is to get purchases or leases organized in such as way so that capital expenses don't bump up all at once."

Warshaw points out that some companies may want to show investors a lot of income, which would favor depreciation of assets over time, rather than expensing them all at once. "If, on the other hand, the company is making lots of money and wants to maximize its deductions up front, it might look to expense the equipment payments each month. It really depends on your situation," he says.

That's one reason why it's worth doing a projection in December to see if your organization is likely to owe the government a sizable amount in taxes. If so, your company might want to use its cash to purchase office supplies, new stationery or other items that won't last a year so it can receive the immediate deduction, says Warshaw.

"Maybe the write-off is more important this year than the depreciation," says Warshaw. "And your balance sheet will look different, too, the more you capitalize your asset. For technology companies, that might mean capitalizing the interest expense related to the cost of a project."

For example, a company may decide to purchase a large computer or other piece of equipment. By leasing and claiming the deduction of lease payments, it would have a steady amount to deduct from income, smoothing out the company's cash flow.

Then again, depreciation could produce significant changes in deductions from income each year, making cash management more difficult.

The choice comes down to a pay-now vs. pay-later scenario.

"For the IRS, a business would want to write off things quickly, getting the deduction, while for shareholders, you would want to show a longer life for your assets," says Clare.

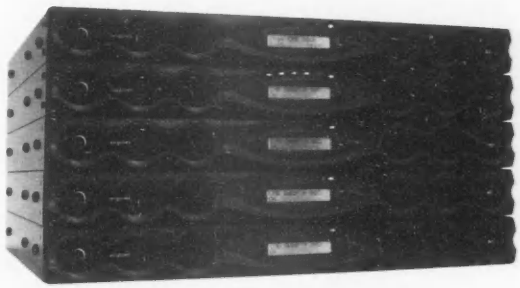
Now vs. Later

CAPITAL ASSETS
Computer equipment
Office furniture
Machine tools
Factory equipment
NONCAPITAL ASSETS
Office supplies
Food for employees
Inventory

Are there business terms you would like to learn about in QuickStudy? Please send your ideas to quickstudy@computerworld.com.

POWER. BRAINS. LOOKS.

IT HARDLY SEEMS FAIR.



Easy to Manage Server Appliances.

Looking for an unfair business advantage? Then get our new, scalable, high performance server appliances that are only 1U high, built with lights-out remote management and pre-configured so you can just plug them in and go. Because all's fair in love, war, and, of course, business. 877-638-8277

networkengines

www.networkengines.com

©2000 Network Engines

JOE AUER/DRIVING THE DEAL

Good note-taking can go a long way

NEGOTIATION AGENDAS and meeting minutes prepared by your team are important. Make that *very* important. Your team should develop a formal agenda for every negotiating session with a potential supplier.

The benefits are many: You'll prepare better; you'll be able to control the meeting and the vendor more easily; you'll ensure that the points you want to address are addressed — and in the right order (some points become more or less important if related issues are won or lost); and you'll be able to use your team members more efficiently (group topics so that team members who are specialists in one or two need to be there only when their topics are discussed).

Why should you run vendor meetings? Because you've got what they want — the money.

Failure to record the results of negotiations in a clear and concise manner can lead to disagreement between the parties over what was actually discussed — or agreed to. The confusion will lead to protracted negotiations — and perhaps mistrust — between the parties. The cure is simple: Make sure someone on your team takes complete and accurate minutes.

It's also useful for scribes to be in on your planned tactics, objectives and team roles. Actually, it's interesting how much the note-taker can control the negotiating session itself. He can request clarifications during a strong bargaining initiative by the other side (to slow its momentum), recall previous points that support your objectives and control the tempo of the interaction. In short, controlling the documentation of negotiation information helps keep the vendor in check.

If the one of the members of the negotiating team is assigned the scribe's role as an ancillary task, the results may be unfortunate for two reasons.

First, the quality of the minutes may suffer because the scribe is more focused on another role in the negotiations.

Second, the scribe's performance as a member of the negotiating team may suffer from a lack of focus.

Having a full-time scribe emphasizes that taking minutes is important and will be done thoroughly.

The scribe should attend every negotiating session to produce and document meaningful results.

To get things started, before or when the negotiating session begins, provide the potential vendors with a negotiations protocol, which states the following points:

- The customer will provide a meeting agenda and a dedicated scribe.
- Either party may request that the scribe read the notes regarding a particular negotiating point.
- Copies of the minutes will be provided to both parties.
- Discrepancies will be reconciled either outside of formal negotiating sessions or at the next negotiating session.
- The potential vendor may propose issues to be included in the agenda for the next meeting. Notice the control on this point.

The agenda will determine the sequence of the negotiation minutes.

You can have the scribe prepare a minutes template that lists each negotiation point from the agenda. Subheadings under each point can include "our position," "vendor's position," "discussion comments" and "status" — such as resolution of the issue. Using this format, the minutes provide a clear trail to understanding how the current status was reached.

After each negotiating session, the minutes can be used to update team members who weren't in attendance, update or modify the team's negotiation plan and help develop the next session's negotiating agenda.

The minutes are also very useful in preparing the final contract if they capture specific contract language as it was agreed to during the negotiations. Save all of your notes, since having the negotiation notes along with the contract can be very important later in the event of a dispute. You may want to eventually establish intent, the basis for an agreement or how you were induced into the agreement.

Most customer teams could improve greatly on preparing for, controlling and documenting each negotiating session. The meeting agenda and minutes are powerful tools.

So get better at determining what's going to happen, controlling what happens and documenting what happens — and you'll see better results.

JOE AUER is president of International Computer Negotiations Inc. (*www.dobetterdeals.com*), a Winter Park, Fla., consultancy that educates users on high-tech procurement. ICN sponsors CAUCUS: The Association of High-Tech Acquisition Professionals. Contact him at **joea@dobetterdeals.com**.

BRIEFS

Galileo Reports Decline in Bookings

Galileo International Inc. in Rosemont, Ill., last week said its third-quarter computerized reservations bookings were lower than planned, due partly to the continuing shift toward online ticketing, a trend that pulls business away from Galileo's main customers, travel agents. It also attributed the loss to negative effects from flight cancellations by Chicago-based United Air Lines Inc., which founded Galileo and retains an ownership stake of roughly 17% in the company.

However Galileo added that its earnings for the third quarter should still meet expectations – about $385 million, up 5% from the same period last year. The final results are due to be announced Oct. 23.

Galileo is trying to break into the online travel market through Trip.com, a ticketing Web site focused on business travelers that it acquired earlier this year.

Cell Phone Users Resist Legislation

A recent survey found that while 70% of people agree that driving while using a cell phone is dangerous, most still don't want to see legislation passed that would prohibit the use of cell phones while driving.

The survey of 300 adults, conducted over the Internet Sept. 30 by InsightExpress LLC in Greenwich, Conn., showed that 61% disagreed with legislation, such as an ordinance proposed in Chicago banning cell phone use while driving.

Consortium Explains ASP Contract Basics

The ASP Industry Consortium recently announced a new guide aimed at helping consumers understand application service provider (ASP) agreements. The "End Users Guide to Service Level Agreements" is available through the ASP Industry Consortium's Web site, *www.allaboutasp.org*. The guide, however, is only a first step for the Wakefield, Mass.-based group. The consortium said it plans to release a much more comprehensive document to help ASPs develop service-level agreements.

Stamps.com Experiences Exodus

Santa Monica, Calif.-based Stamps.com's CEO, president and chief operating officer, chief financial officer and comptroller all resigned last week. Officials at the online postage services company said outgoing CEO John Payne and outgoing President and COO Loren Smith will both serve on the Stamps.com board of directors.

Payne will be replaced by acting Chairman Marvin Runyon.

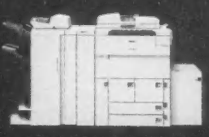
CFO John LaValle and Comptroller Candelario Andalon are leaving the company to pursue other interests, according to a statement released by the company.

The price of Stamps.com shares sank to $2.43 in early-morning trading on the Nasdaq Stock Market Oct. 12, down from a high of $98.50.

Authoria Names CTO

Authoria Inc. recently named Peter Schilling its chief technology officer. Prior to joining Authoria, a Waltham, Mass.-based electronic communications provider, Schilling served as CTO and vice president of engineering at TradeOut Inc., an online business-to-business Internet marketplace for business surpluses.

Call 1-800-OK-CANON, or
visit us at www.imagerunner.com



Sort and staple just doesn't cut it in a right-from-your-desktop, 3-hole-punch, saddle-stitch kind of world.

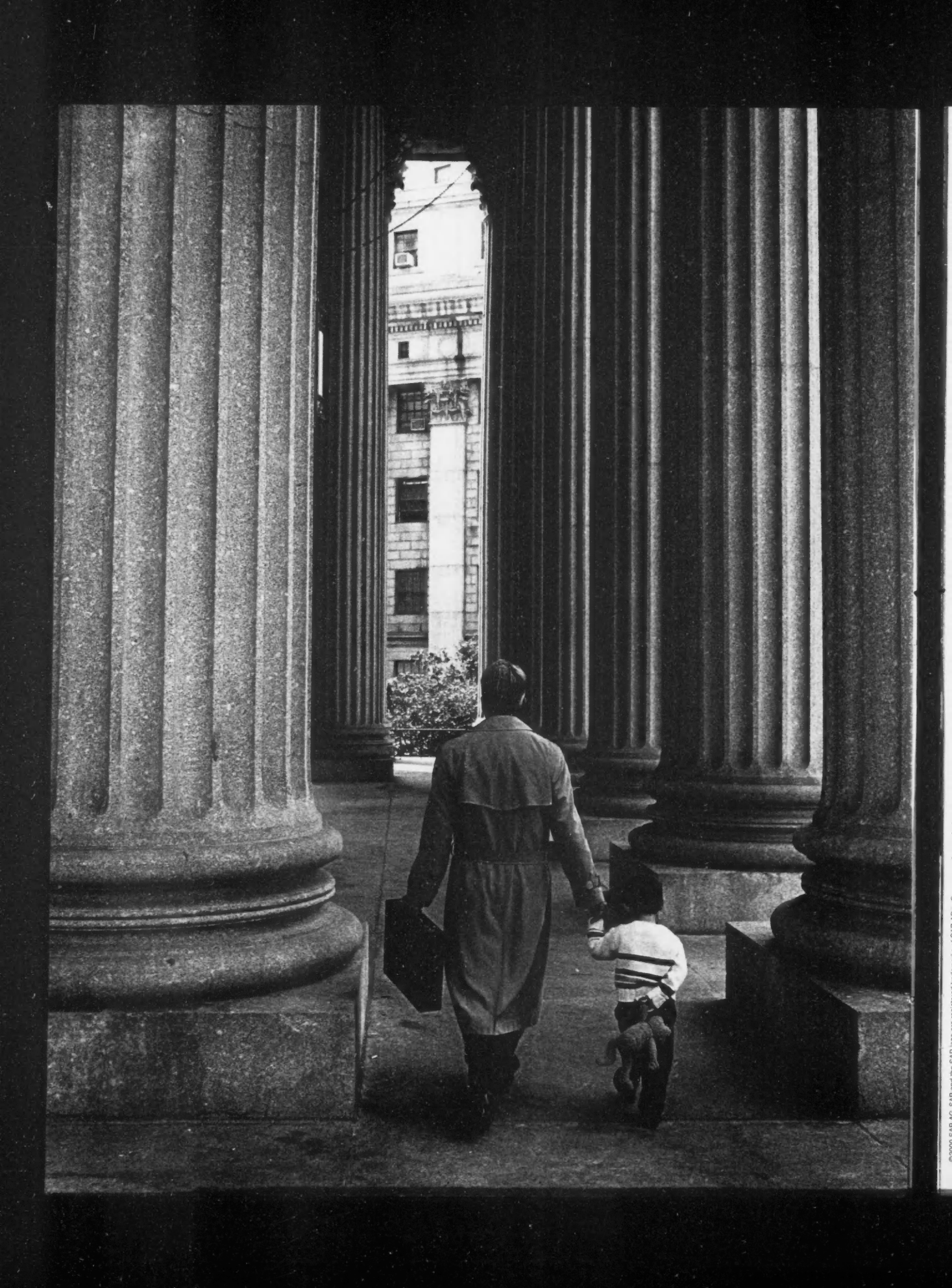
Imagine creating 200-page, three-hole-punch documents right from your desktop. The Canon imageRUNNER 600 Digital Production System lets you do just that.

With ingeniously easy-to-operate Canon document finishing software and the touch of a mouse, the imageRUNNER 600 enables you to saddle-stitch booklets, side-staple reports, plus z-fold and index as you see fit. So look into the Canon imageRUNNER 600. Then, look out.

imageANYWARE imageRUNNER 600

Canon KNOW HOW™

IMAGEANYWARE℠ is a service mark of Canon U.S.A., Inc. IMAGERUNNER and Canon Know How are trademarks of Canon Inc. © 2000 Canon U.S.A., Inc.



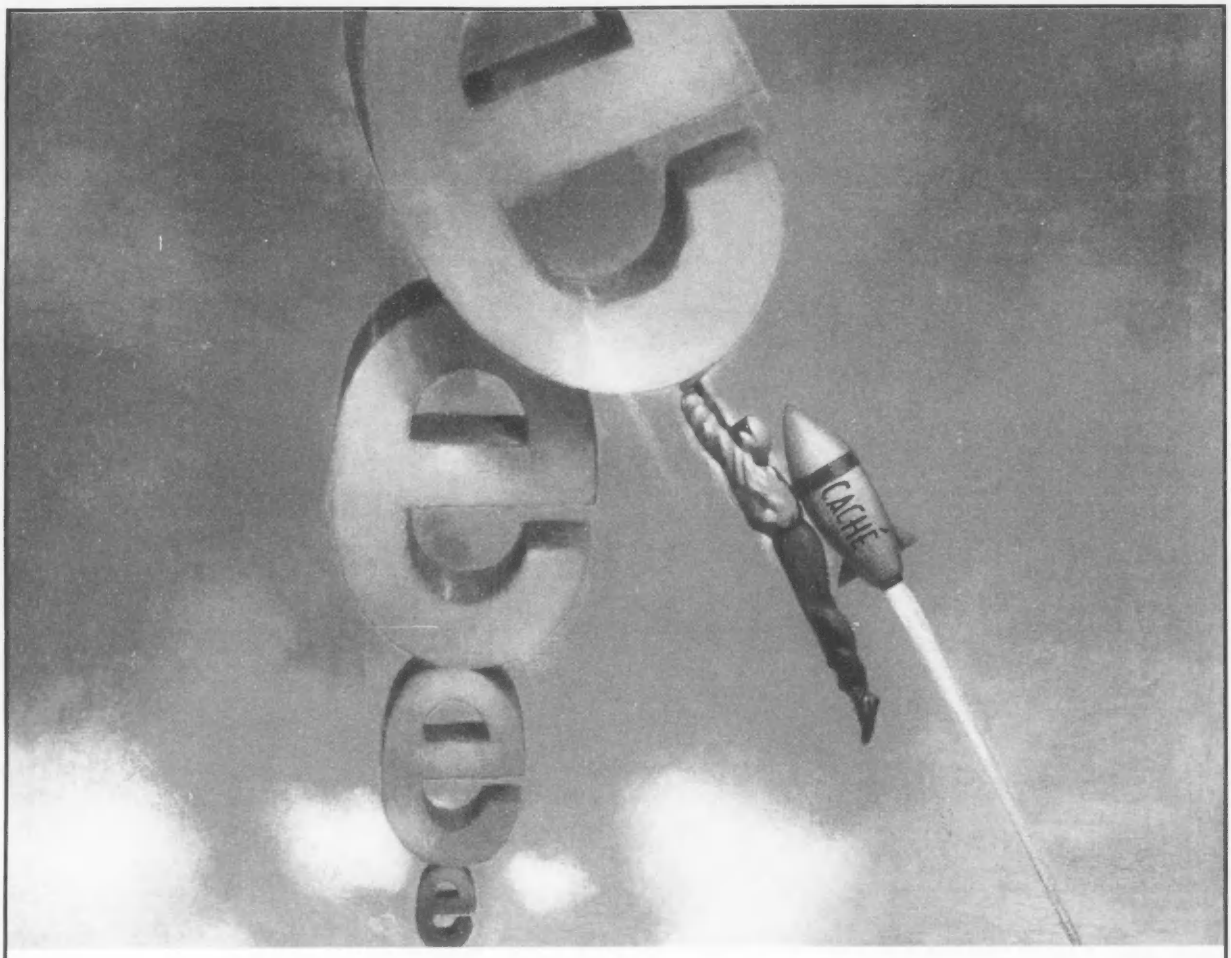
ANNOUNCING SOLUTIONS FOR THE *NEW*, NEW ECONOMY.

(YOU KNOW, THE PROFITABLE ONE.)

The promise of e-business is every bit as robust today as it was when the "new economy" was declared. It's just that things that were labeled passé and irrelevant when IPOs were soaring have returned with a vengeance — planning, infrastructure, even profitability are back in fashion. Welcome to the new "new economy." No company is better suited for this world of value-oriented e-business than SAP. We have the best solutions for collaboration, supply chains, improving customer relationships and generally adding value to a company's business proposition. Out with the "new." In with the "new new." Type in www.mySAP.com

THE BEST RUN E-BUSINESSES RUN **mySAP.com**

©2000 SAP AG. SAP and the SAP logo are registered trademarks of SAP AG in Germany and several other countries.



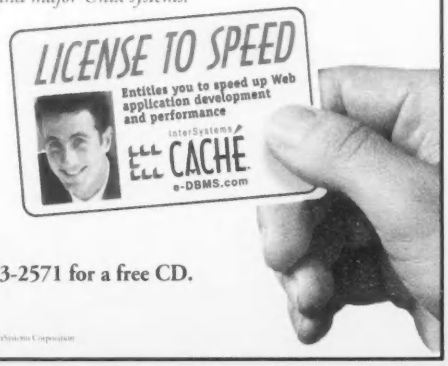
Want to make your *e*-applications scale higher? Make this your *e*-DBMS.

For your new e-application development, make Caché your e-DBMS. Compared to using an RDBMS, you'll develop and deploy more quickly with Caché and your applications will scale to new heights.

Caché is the post-relational database and development platform designed for the demands of Web applications.

Caché object technology provides an extremely fast e-development environment. Plus, its multidimensional data server and application server deliver speed and scalability proven to outperform relational databases. And Caché automatically generates both object classes and relational tables from a single data definition!

Caché is the invention of InterSystems, a specialist in high-performance database technology for over twenty years – with 24x365 support, hundreds of application partners, and 3,500,000 licensed users. *Available for Windows, OpenVMS, Linux and major Unix systems.*



Download Caché for free at e-DBMS.com, or call 1-800-753-2571 for a free CD.

© 2000 InterSystems Corporation. All rights reserved. InterSystems Caché and e-DBMS are registered trademarks of InterSystems Corporation.

TECHNOLOGY

DRIVING DSL

To keep its 3,700 plant employees abreast of production targets, quality regulations and line stoppages, BMW last month began piloting a video system powered by broadband DSL Net connections. ▸ 70

VOICE OF CHANGE

For years, vendors have been trying to convince users that sending voice calls over data circuits makes sense. One international provider has become a believer: Cable & Wireless will migrate voice telephone customers to voice over IP during the next three years. ▸ 72

SECURITY JOURNAL

When executive laptops disappear, concerns about the loss of sensitive data drive Jude to consider encryption and tracking devices. But a simple desktop lock may be the best answer. ▸ 74

HANDS ON

Reviews editor Russell Kay offers a roundup of small-format, full-featured laptops. He finds several interesting machines — and concludes that newer is definitely better. ▸ 76

FUTURE WATCH

As we look beyond the Silicon Age, quantum computing offers speeds that until now were unimagined, and it could be virtually uncrackable as well. So far, the largest quantum computer is the size of a molecule, but researchers say they will be sitting on desktops in a few decades. ▸ 78

ASP ANXIETY

When it comes to choosing an application service provider, knowing what questions to ask up front can spell the difference between a dream relationship and a nightmarish one. A few cautionary tales may help you shape your inquiries. ▸ 80

QUICKSTUDY

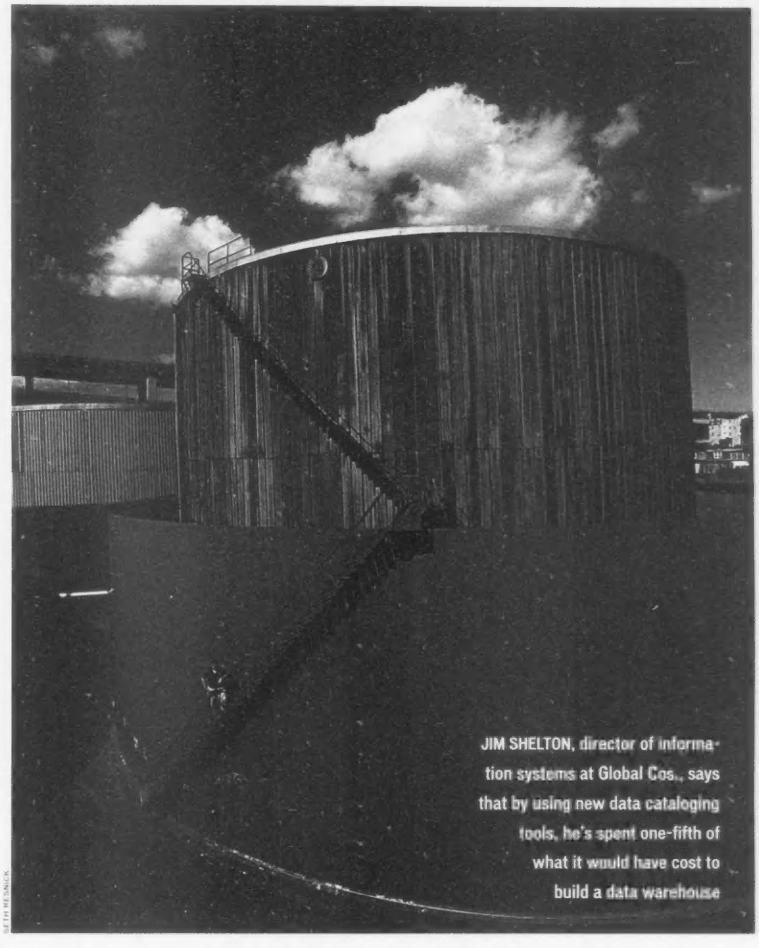
Need to send data to a lot of people? IP multicasting makes this efficient and doesn't hog bandwidth. It's a method of delivering a single packet, sent only once by the source host, to multiple destination hosts that may be connected to scattered subnets. ▸ 86

EMERGING COMPANIES

ViaFone's wireless development tools and services promise to make short work of building unplugged e-commerce applications on the Web. The start-up offers both hosted services and a roll-your-own development environment. ▸ 88

EMERGING MARKETS

With Internet development skyrocketing and South American trade flourishing, the demand for IT workers is hitting an all-time high on Florida's southern shores. ▸ 90



JIM SHELTON, director of information systems at Global Cos., says that by using new data cataloging tools, he's spent one-fifth of what it would have cost to build a data warehouse

ANY DATA YOU DESIRE

FOR YEARS, IT MANAGERS have searched for ways to give users any information they want, whenever they want it, from any database. With data cataloging tools, that dream is nearing fruition. Such tools function like a data warehouse, with a fraction of the development effort and without the overhead.

82

BMW Pilots DSL Video in Plant

Luxury vehicle maker puts broadband video services on the factory floor

BY LEE COPELAND

EVEN IN A state-of-the-art manufacturing plant, things break down, production slows to a crawl, and line workers wonder what's up.

Those are a few of the reasons BMW Manufacturing Corp. installed a high-speed Digital Subscriber Line (DSL) network to provide video services at its Greer, S.C., facility.

"Curiosity does not add to attention and quality output," said Bobby Hitt, a BMW Manufacturing spokesman. "We wanted to add to the communication process and make sure that everyone knows what's going on."

To keep its 3,700 plant employees abreast of production targets, quality regulations and line stoppages, BMW Manufacturing last month began piloting an in-plant video system. The pilot includes 24 monitors set up in the assembly department and plant cafeteria powered by broadband DSL Internet connections that run over the plant's existing copper-wire telephone system.

BMW MANUFACTURING'S in-plant video system will keep 3,700 plant employees informed

But the DSL system wasn't BMW Manufacturing's first choice. The exclusive production facility of Munich-based Bayerische Motoren Werke AG's Z3 and X5 Sports Activity Vehicles originally wanted to install a fiber-optic infrastructure, according to Hitt, but it had to park that plan due to "galloping" costs.

"The cost of routing cable into our existing wire trays alone exceeded the budget by over $100,000," Hitt explained. "And that cost would have been exacerbated further because in our production environment, unlike a house, the installation cannot be done during work hours."

Eric Rasmussen, a senior analyst at TeleChoice Inc. in Denver, said video over the Internet has been problematic because data packets don't always arrive in a timely fashion due to high traffic. But closed-campus environments can avoid those latency problems. "Unlike [the] Internet, which does not have quality controls and relies on best-effort service, in a closed environment like a manufacturing plant, you can prioritize traffic," Rasmussen said.

The DSL system, which cost several hundred thousand dollars to install, offers downstream data transmissions of as much as 4.48M bit/sec. and an upstream capacity of 972K bits.

BMW Manufacturing developed the pilot system with communications software from Target Vision Inc. in Pittsford, N.Y., and DSL management equipment from mPhase Technologies Inc. in Norwalk, Conn.

Andy McCormick, an analyst at Aberdeen Group Inc. in Boston, said BMW Manufacturing will also be one of a few companies testing videocasts over DSL. "It's something that companies want to do, but so far, it's been reserved for large businesses with dedicated fiber connections or private cable TV into the business," McCormick said.

Server Aids Web on Run

Translator supports mobile devices

BY LEE COPELAND

Chicago-based Curious Networks Inc.'s middleware, announced this month, aims to make it easier to tap into the Web from PCs and mobile devices and to query databases, officials said.

The firm's server, called a multichannel access platform, acts as a translator between back-end data systems and applications that run on mobile devices, such as mobile phones and Palm Inc.'s handhelds, as well as on PCs. It won't ship until March, but Curious Networks plans to launch a Web site to give developers free access to the software next month.

The Java-based server is built using Multichannel Access Extensible Markup Language (MAXML), a technology developed by Curious Networks that translates queries from various mobile devices into the appropriate standards-based code to extrapolate data from a back-end system. The server also includes a set of interfaces for different device types.

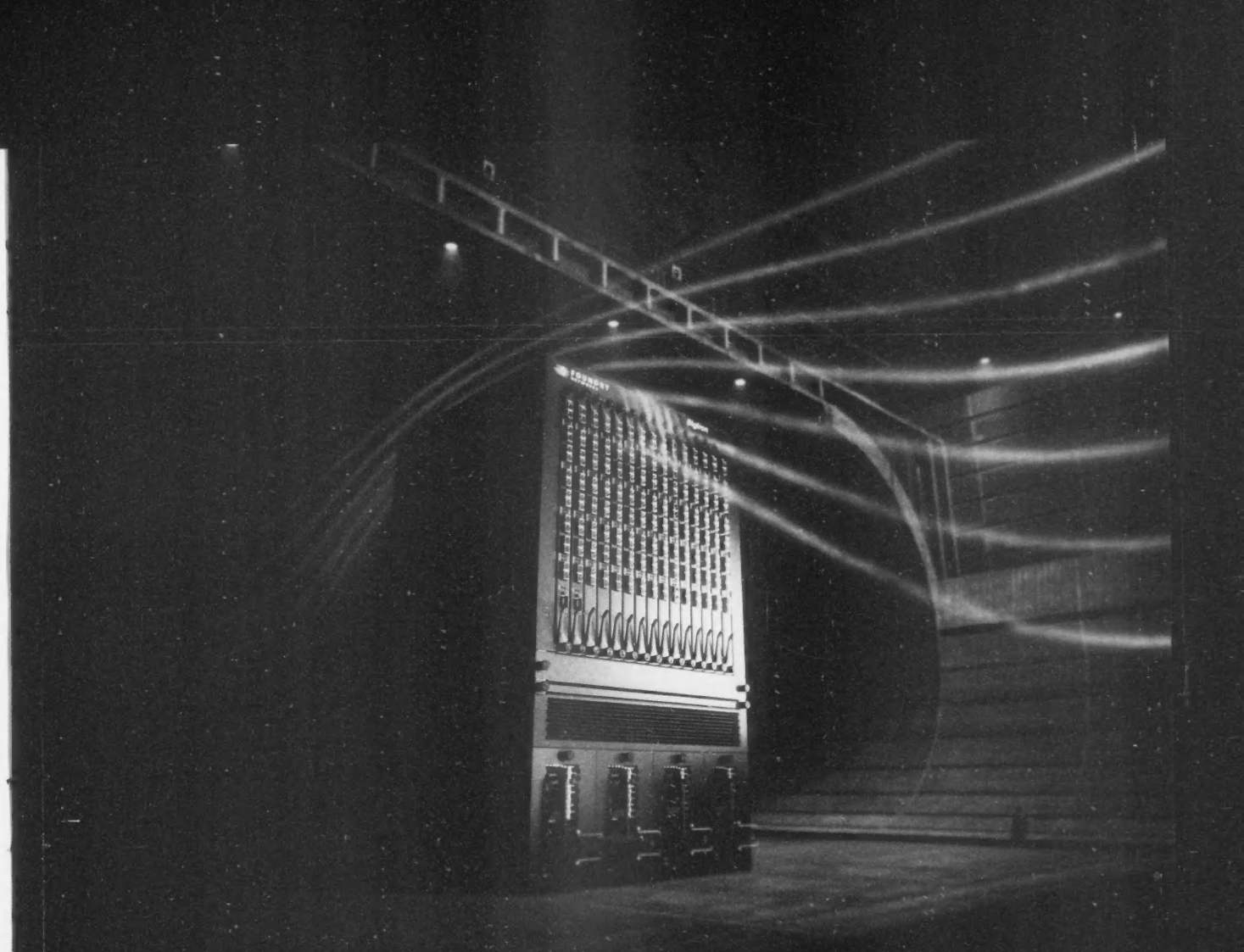
For example, using the MAXML platform, a user could download a corporate Web directory with a Palm and search for a particular individual's name and phone number. If the server was configured to support voice-activated phones, the user could also obtain that same data from a phone without additional changes to the original application.

The Yankee Group, a market research firm in Boston, estimates that 21.3 million users in the U.S. will access data from a mobile device by year's end.

Designing one application that's suitable for a bevy of device formats is a challenge for developers, said Jack Gold, an analyst at Meta Group Inc. in Stamford, Conn. Different screen sizes and data types make transforming information appropriately to different devices very difficult. "For most corporations, it's best to limit your device choices," said Gold.

In the short term, writing applications for devices will remain "tactical, rather than strategic" development projects, he said.

Curious Networks plans to offer its technology as a hosted service and as a stand-alone server. Pricing has yet to be determined.



At 178 Mpps, Who Cares About Aerodynamics?

Scaling up to 178,000,000 packets per second of throughput and 480 Gigabits per second of total switching capacity, the BigIron family of Layer 3 switches leaves competitors floundering in its wash. This isn't just a revolution in speed. It's an evolution in modular design. With scalability of up to 120 Gigabit Ethernet ports, BigIron offers the highest Gigabit density per rack in the industry. And BigIron supports multi-protocol routing including IP, IPX, AppleTalk, OSPF, BGP4 and multicast protocol standards. Best of all, the BigIron family protects your investment—all BigIron modules are interchangeable among the BigIron 4000, 8000 and 15000. So if you care about network performance, call Foundry Networks at 1.888.TURBOLAN (887-2652), email info@foundrynet.com or go to www.foundrynetworks.com/comw. We'll get you up to speed.

FOUNDRY NETWORKS

Big Telecom Provider Turns to Voice Over IP

BY JAMES COPE

While vendors have been touting the benefits of phone systems that send voice over data networks using Internet Protocol instead of over traditional telephone lines, none of the big telecommunications companies have embraced voice over IP for widespread use. Many of them, analysts say, are worried about shelling out more money to deploy and maintain IP-based systems that could cannibalize voice revenue by treating voice calls like any other type of data.

But that changed two weeks ago when Cable & Wireless PLC in London announced that during the next three years, it plans to migrate all of its European and North American business voice customers from traditional circuit-switched telephone services to voice over IP.

"If we go down that road [run voice over an IP network], I'm going to have to be really convinced that I'll have the bandwidth I need for both data and voice," said Kell Achenbach, director of information services at Sky Courier, a Sterling, Va.-based next-flight-out delivery service and subsidiary of Seattle-based Airborne Freight Corp.

Achenbach said his company uses Cable & Wireless' traditional voice services for customer and dispatcher toll-free phone calls.

$1.4 Billion Deal

Customer concerns such as Achenbach's may be why Cable & Wireless elected to have Brampton, Ontario-based Nortel Networks Corp. build, implement and manage its network and voice over IP system, said Eric Goodness, an analyst at Gartner/Dataquest, a division of Stamford, Conn.-based Gartner Group Inc. Cable & Wireless officials said their company will pay Nortel $1.4 billion over the next 10 years.

Cable & Wireless said voice over IP will be rolled out to its customers in Europe and North America first and eventually to Asia/Pacific customers. The company will guarantee voice-over-IP service levels equal to those of standard switched telephone services, Cable & Wireless officials said.

In the new Cable & Wireless network, voice data packets will share bandwidth with other types of data, a company spokesman said.

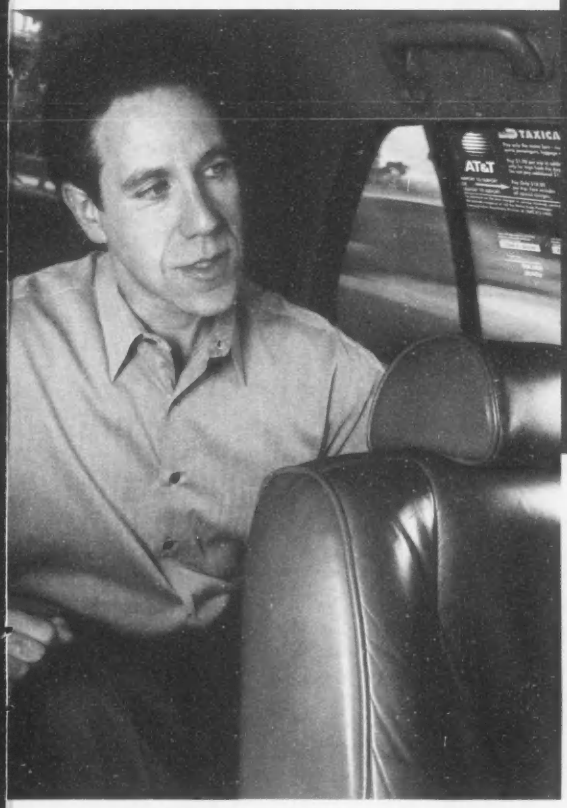
In some instances, according to experts, voice-over-IP technology can cause delay, echo and a general deterioration of signal quality as packets that make up telephone conversations compete with other network traffic.

One way to get around the problem is to give voice traffic higher priority than other data, said Elizabeth Asher, an analyst at Meta Group Inc., also in Stamford, Conn. But on networks like Sky Courier's, other types of data are just as important as voice data.

"[Cable & Wireless and Nortel] will probably overprovision the hell out of the network initially. There is no congestion when there's plenty of bandwidth," Asher said.

> I'm going to have to be really convinced that I'll have the bandwidth I need for ... data and voice.
>
> KELL ACHENBACH, SKY COURIER

Take me to fast, streaming Internet access.



Steven R. Keller - Vice President, Marketing & Content Development, Toddlerwatch. "AT&T provides us with superior networking solutions that enable Toddlerwatch to deliver more than just bytes, bits and data. With AT&T, we now deliver unique experiences to our customers."

Make it live and secure. Toddlerwatch, a Web-based service that connects parents to their young children through real-time streaming video, needed a scalable network solution with powerful levels of reach, speed and security for its bandwidth-intensive applications. **AT&T Data & IP Services** delivered an array of high-speed Internet access including **DSL** and **T-1** connections. **AT&T Managed Internet Services** enables Toddlerwatch to leverage a world-class IP backbone, smart routing capability and continuous performance monitoring. Toddlerwatch now connects thousands of families across the nation with optimum refresh-rate levels and high-quality imaging. If fast, streaming Internet solutions will help your business grow, let AT&T take you there — **now**.

AT&T

Data & IP Services | 1 800 ATT-3199 | www.att.com/business_services

Laptop Security Turns On 65-Cent Solution

High-tech measures give way to simple locks

Security Manager's Journal

WASHERS — those little circular pieces of metal with a hole in the middle designed to help bolts grip a surface without damaging it — have nothing to do with IT security, right?

Well, I hope they do, because I just persuaded my company to buy 1,000 of them.

We have a fair number of laptops sprinkled around the company, mostly among senior managers and salespeople, and every so often, one of them goes missing. The cost of replacing the hardware is a relatively minor problem, but the data on the laptops is another thing entirely.

Our data may not be quite as sensitive as the data on the laptops at MI6, the British intelligence agency, but it's still quite valuable to certain people.

We're investigating laptop-encryption products at the moment, but in the meantime, we've been trying to find a way to physically protect the laptops to make them slightly less vulnerable to loss or theft in the first place.

Protection Racket

The first thing to do was to buy security cables. These are simple things — wrap the cable around the leg of your desk, then secure one end to your laptop using the lock provided. Of course, nothing is quite this simple in real life, and we've already had to deal with lost keys and reluctant staff. The trickiest problem we've faced with this involves our "deluxe" desks.

These desks, used by senior managers and some of the salespeople, don't have exposed legs, so there's nowhere to attach the security cables. This problem went round and round for a while until it reached someone with enough common sense to solve it — unusually, a very senior manager. Even the deluxe desks have a cable hole in one corner, since everybody in the company uses a computer of some sort.

The simple solution was to create a metal ring with a diameter larger than that of the cable hole. You attach the security cable to your laptop, pass the cable through the cable hole, then attach it to the ring, which can't pass through the hole. Simple, *n'est-ce pas?*

Unfortunately, it's taken me about three months to get this simple solution put into practice. We spoke to our facilities team, explained the problem and our suggested solution and asked them to sort it out for us.

One member of the facilities team e-mailed back explaining that what we really needed were security cables for the laptops, and he helpfully gave us contact details for a supplier. I explained that we already had cables but needed a way of attaching them to deluxe desks. The facilities person eventually understood the problem and asked us to call the facilities help desk.

He even forwarded his e-mail to the help desk, which responded with a simple answer in a matter of days. The suggestion? "Buy a laptop security cable. . . ."

We explained the situation calmly and patiently to the help desk. In retrospect, the calm patience may have been a mistake, because I'm reasonably sure that a short bout of bad-tempered shouting would probably have got the whole situation resolved much more quickly.

Once they understood the problem, the help desk staffers farmed the job out to the design team. But the designers didn't understand, so we explained it to them as well.

Two days later, I arrived at my desk to find a security cable wrapped round the exposed leg of my (standard-issue) desk and a quizzical e-mail from facilities wondering what the problem was. They failed to understand the problem over the phone and said they would come by my desk and talk it through face to face.

The commonsensical senior manager who, unlike me, is actually senior enough to have a deluxe desk, neatly took over the conversation before I lost my temper; he asked the facilities team to try the same trick on his desk. The facilities team eventually conceded the point, understood the whole nature of the problem and resolved to go away and solve it for us.

They came back 10 days later having found a supplier that would create custom laptop-security cable-anchoring devices. They could rush the job through with a brief two-week lead time and charge us no more than $6.50 a piece.

That was when I finally decided that contacting our facilities team was probably not the simplest method and contacted my local hardware store. Three-inch washers cost about 65 cents each and do exactly the same job.

The High-Tech Approach

Another, slightly more technological mechanism we've used for laptops is the Indsol Tracer System from SmartWater Europe Ltd. in Newport, England. It uses SmartWater, a nonconductive "liquid forensic coding system" that is designed to be different for each SmartWater user customer and to be uniquely identifiable. It's manufactured by the British government's Forensic Science Service, which keeps a database of which batch belongs to whom.

We're starting to paint each of our laptops with this gizmo, so that if any is stolen and then recovered by the police, they should be able to identify it and return it no matter what's been done to it in the meantime.

We're not sure what to do about disk encryption at the moment. Windows 2000 provides file and disk encryption which would do the job very nicely, since it would require no extra software and (hopefully) be neatly integrated with the rest of the operating system. But we're not rolling Windows 2000 out to the users for at least a year.

Pretty Good Privacy (PGP) Version 5 would do the job, but previous experiences with PGP have shown that even though its interface is clear and simple, it's still too complex for some of our staff. We're going to take a hard look at PGP Version 7 in a few weeks to see if it can do the job.

The rest of my week has been spent closing off as many issues as I can before I spend the next two weeks concentrating exclusively on our software from Atlanta-based Internet Security Systems Inc. (ISS). We have six days of training on the software alongside our head office staff, a planning session on how we're going to use it, then a seminar on another company's implementation of the software.

I've got big plans for ISS's software. If it's really as versatile as it appears, then we're going to be able to use it to coordinate responses to a whole host of issues. I've heard nothing but good reports about the software ever since it came out, so I'm looking forward to coming to grips with it.

THISWEEK'SGLOSSARY

SmartWater: SmartWater Europe Ltd.'s nonconductive liquid, when painted on objects, provides a unique "fingerprint" that works in a way similar to DNA profiling. Recovered devices can be easily identified by a unique code embedded in the liquid, which the company stores in a central database. The British government's Forensic Science Service manufactures the product under license.

LINKS:

www.microsoft.com/windows2000/library/howitworks/security/encrypt.asp: This white paper describes Microsoft Corp.'s Encryption File System, which is included in Windows 2000.

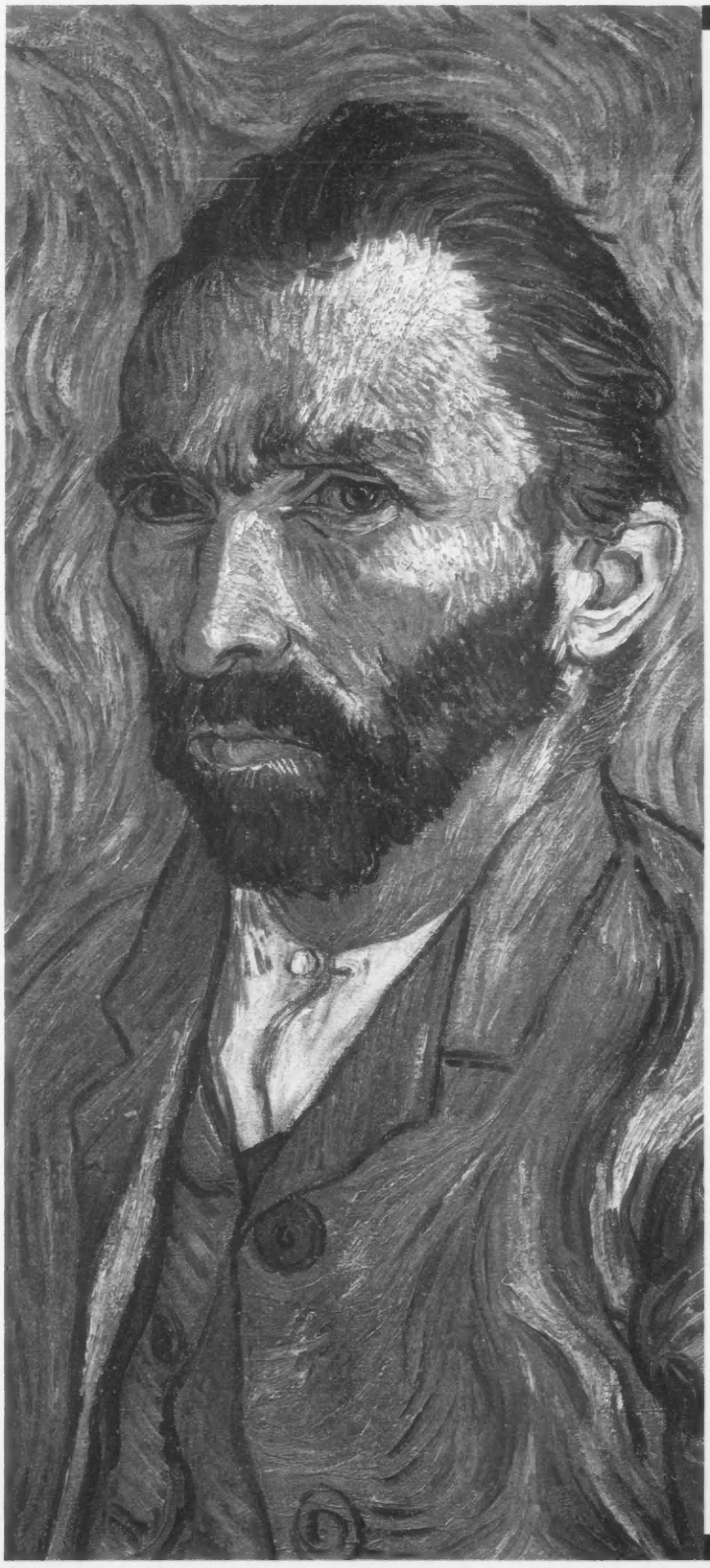
www.pgp.com: PGP Security, a subsidiary of Network Associates Inc. in Santa Clara, Calif., is the source for downloading PGP encryption software. Both a free downloadable version for personal use and a commercial version are available.

www.smartwater.com/: SmartWater Europe's Web site contains information on several products that use SmartWater security identification technology.

www.iss.net: Atlanta-based Internet Security Systems' home page includes information on RealSecure security management tools and SafeSuite scanning software.

www.computersecurity.com/laptop/: One example of the many sources for physical laptop security devices. Nashua, N.H.-based Computer Security Products Inc.'s Web site has one of the more interesting product names: the Smith & Wesson Laptop Kit.

■ This journal is written by a real security manager, whose name and employer have been disguised for obvious reasons. It's posted weekly at *www.computerworld.com* to help you and our security manager – let's call him Jude Thaddeus – better solve security problems. Contact Jude at jude.t@lycos.com or click on *Computerworld.com*'s Security Watch community forum to participate in discussion topics.



I'D GIVE MY LEFT EAR TO GET THAT EMAIL BACK.

It's enough to drive you crazy. You inadvertently send an email containing your company's sensitive or confidential information.

But there's no need to over-react. Because now you can get your email back. With MailRecall™ from Authentica.

MailRecall lets you manage the digital rights over your email at all times – even after you've sent it. You decide who sees it, what they do with it, which parts of it they see, how long they see it for, who they can share it with, whether they can print it, save it or forward it – in short, everything about how it is used and distributed.

Why take chances? Find out more about MailRecall.

For a free trial or to order an evaluation kit for your company, visit us at **www.authentica.com**.

Because when people discover email they can get back, they're all ears.

authentica

protect your information

877.532.8060
781.487.2600

Likable Little Laptops

Our reviewer finds a winner in his ongoing quest for a better, smaller notebook computer. By Russell Kay

I KEEP SEARCHING FOR the "perfect" small notebook computer to carry when I travel, and over the past six months, I've tried out a number of machines: Compaq's Armada M300, Fujitsu's LifeBook B Series, IBM's new ThinkPad X20, Toshiba's Portege 3480CT and finally, a couple of ringers, NEC Computers Inc.'s MobilePro 780 and 880 (see "NEC's Small Wonders," top right).

All but the NECs are full-fledged Windows PCs that typically weigh between 3 and 4 lb. in their normal configuration. That's a basic requirement for this group. The catch: "Normal configuration" means no removable drives; CD-ROM (or DVD-ROM) and floppy disk drives are all external. For the LifeBook and Portege, these drives attach by proprietary cables with special connectors on each end. Also, these machines don't have all the standard attachment ports — serial, parallel, video out, Universal Serial Bus (USB), modem, network or mouse and keyboard — on board. Most rely on an external port replicator (usually cable-attached) or put the ports on one of the external disk drives. Both approaches happen to bug me, but you might like one or the other just fine.

Ports and removable drives aside, these are well-equipped machines, with plenty of RAM, big hard drives and high-quality active-matrix displays no larger than 12.1 in., making for very tiny packages indeed.

None of these machines has everything I'd like in one package, though one comes as close as I've seen.

Compaq Armada M300

Compaq Computer Corp.
www.compaq.com
from $2,599

The Armada clips onto a separate base called a mobile expansion unit, which holds an external CD-ROM, DVD-ROM or floppy disk drive and uses the same power supply, making it a very handy, easily transported package. But the Armada's keyboard is one of the worst of this bunch, it's dead flat and relatively lifeless in action. The screen has since been upgraded to XGA (1,024- by 768-pixel resolution) over the SVGA-only model I used, and that's a welcome change. Overall, this is one of the most convenient packages in this group.

Fujitsu LifeBook B Series

Fujitsu PC Corp.
www.fujitsu-pc.com
$1,999

Fujitsu designers decided to take full advantage of this machine's small 10.4-in. screen and made it touch-sensitive, and then they included a stylus that slips into a slot next to the screen. This is a great replacement for a mouse in most applications, and it's faster and more accurate than either a pointing stick (also incorporated) or a touch pad. The main drawback to this arrangement is that the coated screen is slightly less bright than its competitors, and it reflects more ambient light. The keyboard is unfortunately very flat with only a so-so feel, and typing on it was a bit more of a chore than on other machines. This is a nice little machine that a lot of people may find easier to use than other laptops because of the stylus and touch-screen combo.

IBM ThinkPad X20

IBM
www.ibm.com

When I started this review, I had intended to discuss IBM's ThinkPad 240, a tiny, engaging machine with a few drawbacks [Technology, Nov. 15, 1999]. Then IBM launched its successor – which is also the follow-on to the ThinkPad 570 – in which it has fixed all the problem areas and then some. The screen is nearly 2 in. larger and has higher resolution. The basic machine's titanium-and-plastic body clips into a base that carries a floppy disk drive and has an open bay that will take any of the optical or hard-drive options that fit any of IBM's new A- and T-Series ThinkPads. It has unquestionably the best keyboard of any in this roundup, and it includes something brand-new for laptops: a Compact Flash slot that will take solid-state memory cards or IBM's new 1GB Microdrive. Limited battery life was a problem with the 240, but the X20 has a bigger battery. It comes in two models, and I had a chance to try out both. For me, the Celeron-based model's SVGA screen was a drawback. The top model, with a 600-MHz CPU, 1,024- by 768-pixel resolution, 128MB of RAM and a 20GB hard drive, is the machine I want to travel with. At 3.5 lb. without the add-on base, it's light but easy to see and work with. Other nice touches: a small but adequate lamp that illuminates the keyboard. I also got a chance to use the new low-profile CD-RW drive, and that makes a great combination. The only drawback is the $2,899 starting price ($2,199 for the Celeron model).

Toshiba Portege 3480CT

Toshiba America Information Systems Inc.
www.toshiba.com
from $2,499

This machine frustrated me quite a bit. It's well made – something I've come to expect from Toshiba. The keyboard is flat but has pretty good touch, and it has a pointing stick, which I prefer to a touch pad. The XGA screen is bright and crisp. But overall, instead of being a well-integrated whole, the 3480CT seems to have a zillion separate pieces, almost an assemble-it-yourself kit. I tried the optional high-capacity second battery that slips into a separate base; the notebook clips on, becoming a half-inch thicker and about 2 lb. heavier. The separate DVD-ROM drive I reviewed is more than half the size of the basic computer itself, containing serial, parallel, PC Card, mouse, USB, network, video-out and AC power ports. The power brick attaches via a rubbery connector that seemed flimsy, though it worked the whole time I used it. I liked the computer by itself. But for traveling, when I know I would have to take along the bulky external drive and the battery base, it would be a little too complicated.

NEC's Small Wonders

The NEC Electronics Inc. MobilePro 880 ($1,099) and 780 ($899) are ringers. They run Windows CE and have no hard drive. They do have very good color touch-screens and styluses and built-in 56K-bit modems, and they accept removable media in the form of Compact Flash or PC solid-state memory cards. The bundled applications are "pocket" versions of Microsoft Word, Excel, PowerPoint, Outlook, and Internet Explorer.

Though far from full-featured, they are adequate working tools. What sets these machines apart from other handheld PCs is their keyboards, which are close to full-size, with good feel.

Of the two machines, the 880 looks like a "normal" laptop, with its 9.4-in. SVGA screen (similar to the Compaq Aero 800; see Technology, Sept. 13, 1999).

After using both, my choice is the 780. Its half-height screen makes it incredibly portable. It's great for taking along almost anywhere; it won't fit into a shirt pocket but rides handily in just about any kind of shoulder bag or portfolio, and its instant-on operation is superconvenient. – *Russell Kay*

My Choices

For general travel use, where I have to pick up Lotus Notes e-mail over the Internet, my choice is unhesitatingly the ThinkPad X20. The 12-in. XGA screen and clip-on expansion base make this a great traveler. If I didn't need Notes and could make do with Post Office Protocol 3-based Internet mail, my choice for shorter trips would likely be the NEC MobilePro 780: big enough to do real work on, yet small enough and light enough to take anywhere, anytime.

The Power Made Simple™

For Business Intelligence
Choose the Power of One

NEEDS	OPTIONS		SOLUTION
Data Mining	Oracle	or	MicroStrategy
Analytics	Business Objects	or	MicroStrategy
Financials	Hyperion	or	MicroStrategy
Reporting	Cognos	or	MicroStrategy
Statistics	SAS	or	MicroStrategy

MicroStrategy 7 delivers the industry's best Business Intelligence performance in one, easy to deploy, easy to use platform.

Data Mining: MicroStrategy's Intelligence Server uses sophisticated data mining techniques that can identify important trends in your business operation.

Analytics: MicroStrategy's analytical engine is able to perform the most advanced analytical queries against any volume of data.

Financials: Effortless access to complex financial questions such as NPV computations and bond value calculations.

Reporting: Superior reporting capabilities including advanced drilling, table pivoting and flexible formatting allow users to create presentation quality documents and customized reports.

Statistics: MicroStrategy 7 is powered by an extensive library of mathematical and statistical functions, from descriptive statistics such as standard deviation and kurtosis, to hypothesis testing such as t-tests and F-tests.

The Best of All, All in One.

Order your **FREE Evaluation Copy**

Experience the power of MicroStrategy 7 for yourself

www.microstrategy.com/eval

1-888-537-8135

MicroStrategy®

The Power of Intelligent E-Business™

BUSINESS INTELLIGENCE | eCRM | NARROWCAST NETWORKS

© 2000 MicroStrategy Incorporated. MicroStrategy and The Power of Intelligent E-Business are either trademarks or registered trademarks of MicroStrategy Incorporated. All other brands are either trademarks or registered marks of their respective brands.

Quantum Leap

As we look beyond the Silicon Age, quantum computing offers up-to-now unimagined speeds, and it's virtually uncrackable as well. By Allison Wright

IMAGINE A COMPUTER with speed previously unheard of, the agility to solve calculations that would stymie a conventional computer and the ability to produce more secure lines of communication.

Impossible in the foreseeable future? Actually, researchers think this type of machine, in the form of a quantum computer, may move out of their laboratories by the end of the decade.

The largest quantum computer built to date, however, is a 5-bit device created by IBM's Almaden Research Center that has been squeezed onto a single molecule.

The concept of using quantum physics to perform simultaneous computations on massive amounts of information has been in the works since the 1980s. It was only about five years ago, however, that quantum computing became a major area of interest to computer theorists around the world.

Unlike a conventional computer, a quantum computer could conceivably process every possible input simultaneously through a series of quantum switches connected in parallel. In effect, it would be the most perfect form of parallel processing imaginable, dealing with information in a way that's impossible for conventional computers, which follow the rules of binary logic — an either/or distinction.

In a binary system, each bit of information is either on or off, one or zero, true or false. A conventional computer strings together combinations of ones and zeros to represent pieces of information, whereas quantum computers are made up of quantum particles such as electrons and atomic nuclei. Each particle represents a quantum bit, or qubit.

Qubits differ from conventional bits in that an atom or nucleus can be in a state of "superposition," acting as both a one and a zero simultaneously. Quantum computers take advantage of the behavior and properties of atoms to potentially provide switching and processing speeds millions of times faster than those of today's supercomputers.

For example, if you have two qubits, they could simultaneously exist as a combination of all possible two-bit numbers: 00, 01, 10 and 11. Add a third qubit, and you could have a combination of all possible three-bit numbers: 000, 001, 100, 110 and 111. This system scales exponentially: n qubits can stand for $2n$ numbers at once. Line up a mere 50 qubits, and you could represent every binary number from zero to more than a trillion — simultaneously.

Overcoming Obstacles

A major obstacle that researchers face in developing quantum computers is making sure the qubits retain their superposition of being both — or either — a one or a zero. Observation of a quantum computer allows an outside interference such as light or noise to exert some influence over the qubits, forcing them to collapse and leaving an ordinary computer based on ones and zeros.

In order to allow quantum states to store information, a quantum computer can't interact with its environment. But at the same time, it has to be manipulated to allow calculations to be performed.

"Reliability is a serious factor for quantum computers. We need to devise ways of coding information so that qubits will not be affected by the environment — a fault-tolerant effect," says John Preskill, a professor of theoretical physics at the California Institute of Technology in Pasadena, Calif.

Quantum computers hold great promise in the area of cryptography. The transmission of encrypted data over fiber-optic communications using single photons (packets of light) could be used to foil code breakers. Qubits can't be copied or cloned, so it would be virtually impossible for a hacker to break code encrypted with a quantum computer.

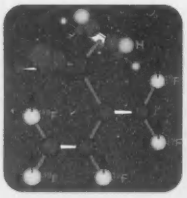
On the other hand, "if a hacker possessed a quantum computer . . . security would be threatened because he or she would be able to break the codes of conventional computers," says Preskill.

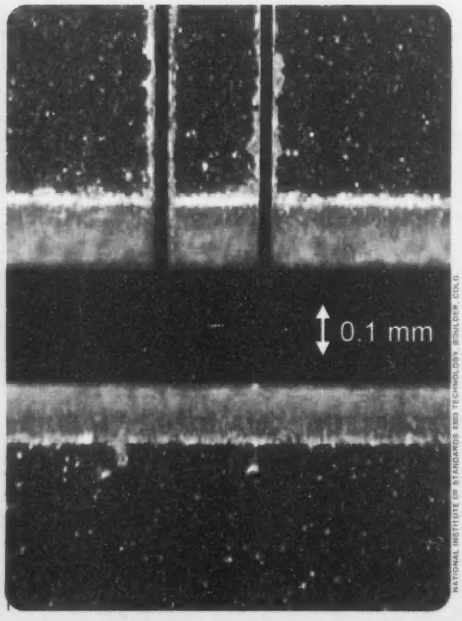
Carl Williams, a physicist at the National Institute of Standards and Technology in Gaithersburg, Md., and Umesh Vazirani, a professor of computer science at the University of California, Berkeley, say absolutely safe lines of communication will require a quantum repeater.

A quantum repeater would allow the photon being transmitted over optical fiber to be repeated without being disturbed. The repeater would allow the photon to be transmitted another 50 km. For this to work, the photon would need to be duplicated in its superposition (the pair of complex numbers describing its position).

"A quantum repeater is possible in principle, and scientists are trying to make it happen. The main challenge is that the repeater must be a quantum device — some kind of quantum switch, since any measurement of the photon would reveal only a very small amount of information about the quantum state of the photon," says Vazirani.

Scientists need time to work through the challenges of quantum computing, including the development of a computer with capacity of 50 qubits or more, but the important first steps toward that goal are currently under way, according to Vazirani.

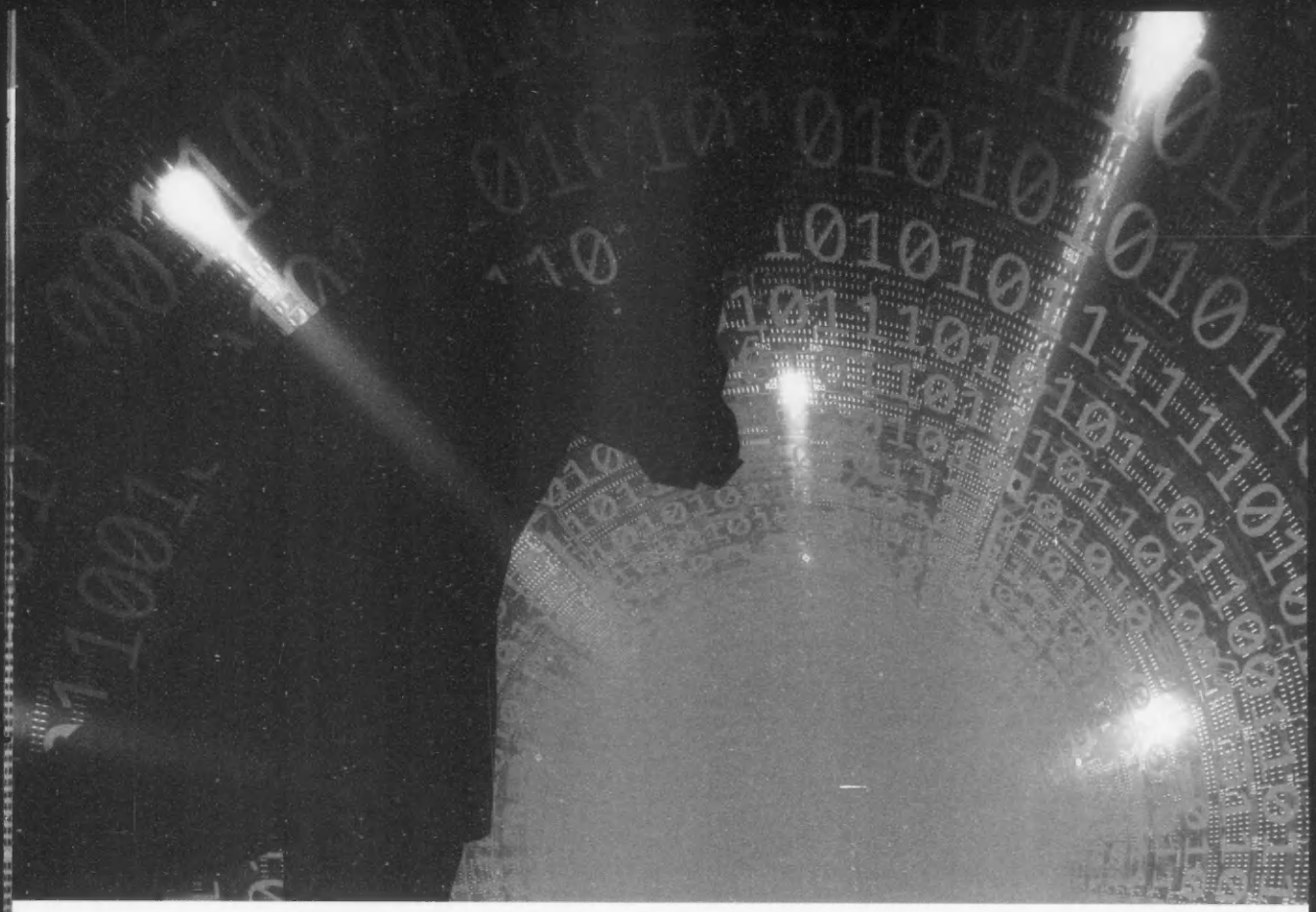




NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, BOULDER, COLO.

The Power Of Quantum

The molecule diagrammed above is the world's most advanced quantum computer. Each of the five fluorine atoms can act as a quantum bit, or qubit, to solve mathematical problems. At right, a metal electrode structure holds five beryllium ion qubits (the white dots at the center of the electrode structure). When this "accumulator" is illuminated by laser beams, rudimentary quantum logic operations can be carried out between the ion qubits.



Don't be mystified by SAN solutions.

The choice is clear.

BROCADE

Combining award-winning Fibre Channel switches and SAN management software, Brocade solutions provide scalability, simplified storage management, system interoperability, and availability. Brocade partners with major storage and systems OEMs and Integrators to provide SAN solutions optimized for LAN-free and serverless backups, storage and server consolidation, disaster tolerance, and high-availability applications. It's no wonder that Brocade is the industry leader—and the clear choice—for SAN solutions.

NetworkWorld Blue Ribbon WINNER

Just ask the judges at NetworkWorld, who recently gave the Blue Ribbon Award for best product to Brocade SilkWorm switches. Visit www.brocade.com and click on the award to learn more.

©2000 by Brocade Communications Systems, Inc. All rights reserved. Brocade and the Brocade logo are registered trademarks of Brocade Communications Systems, Inc., in the United States and/or in other countries.

Asking the right questions up front can mean the difference between a dream relationship and a nightmarish one. By Gary H. Anthes

IT WAS AN E-COMMERCE MANAGER'S WORST nightmare. The OshKosh B'Gosh Inc. online store appeared open to customers — they could place orders — but the orders went nowhere. The communications link between the clothing retailer and the company hosting its Web site had gone down.

But the nightmare was just beginning. The Oshkosh, Wis.-based company struggled for several days to re-establish contact with its Web server at Digex Inc. in Cupertino, Calif. "The [Digex] facility was secure, and they wanted a two-day notice before anybody could get into it," says Jon Dell'Antonia, CIO at OshKosh. "But how are you going to notify them two days before you have a failure?"

Dell'Antonia's problem was further complicated because OshKosh's outsourcing contract was with Sunnyvale, Calif.-based application service provider (ASP) Pandesic LLC, which had, in turn, subcontracted with Digex for the hosting site and servers. And it was a fourth party — OshKosh's telecommunications carrier — that needed to get into the Digex site to repair equipment.

"It was like the Three Stooges and the Keystone Cops combined," Dell'Antonia says. "If I went through the whole litany, you'd be rolling on the floor laughing. But we were not laughing at the time."

The lessons are clear for information technology managers: If you don't ask the right questions up front, you risk paying the price later. Fortunately, managers contemplating moving to an ASP can learn from the experiences of veteran users.

Measure of Success

The Motley Fool Inc. in Alexandria, Va., outsources the running of its payroll, budgeting and other financial systems to USinternetworking Inc. (USi) in Annapolis, Md. Kevin Book, senior director of technology at The Motley Fool, says his own IT experts "went on-site and really put them through the wringer," especially on issues of security, system availability, capacity for growth, data redundancy and technical support.

But The Motley Fool's interest in USi's technology went only so far, Book says. "On their hardware and software platform, we were relatively agnostic," he says. The bottom line for all the questions put to USi was "availability," and The Motley Fool's contract with USi contains quantitative service-level agreements (SLA) and penalties, he says.

If the ASP industry were a mature one, users would just need to specify service levels in their contracts and let it go at that, says Audrey Apfel, an analyst at Gartner Group Inc. in Stamford, Conn. "But it's an immature market. Half the ASPs are going to fail, so you better spend time placing a good bet," she says.

Apfel says customers often concentrate on the *A* in ASP — the application that will be provided — but they should focus more on the *S* — the service component. "The thing that's important is the people," she says. "Ask them how they hire, train and retain staff. When they have turnover, how do I know that expertise I need is not walking out the door?"

Apfel says performance guarantees and penalties are important, "but if there's a metric in your SLA you can't audit, it's not very useful." Audit tools could include users' own record keeping, reports from the ASP or automated, real-time Web monitors.

Jay Robertson, vice president of data center operations at USi, says users should ask, "You say you are going to provide 99.9%, but how are you going to measure it, and what does it include?"

Business vs. Technology

Another mistake some users make is bringing their application specialists but not their technical or operations people to meetings with prospective ASPs. When that happens, USi recommends that the potential customer bring more technically savvy people to the next session, Robertson says.

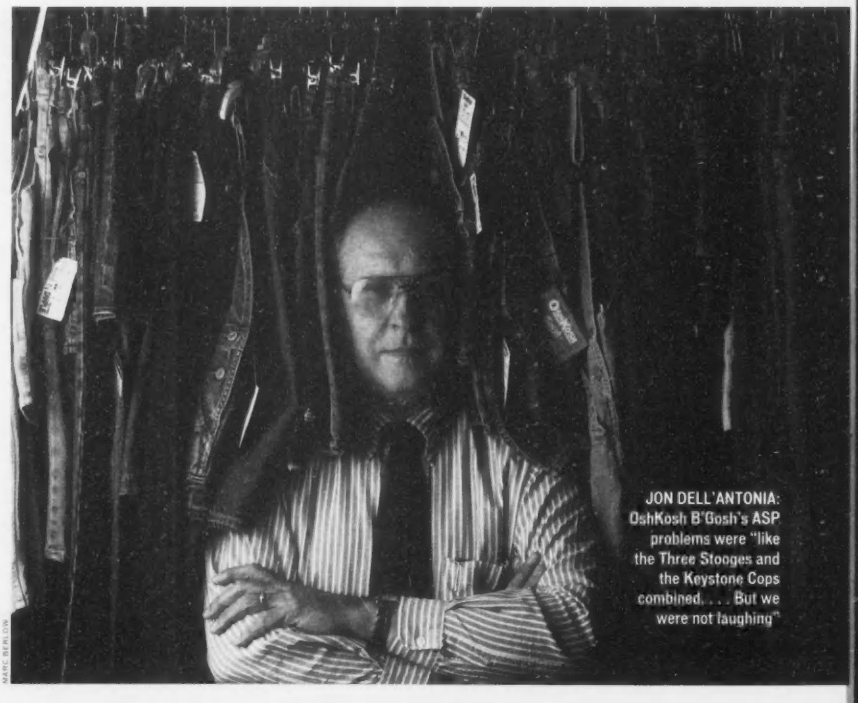
Some users forgo the nitty-gritty technical analysis and simply count on being able to leverage their clout with the ASP during the course of service.

Clifford Macaylo is the supply-chain vice president at Fischbach & Moore Electric LLC in New Providence, N.J., which has contracted with Cephren Inc. in Palo Alto, Calif., for procurement and project-management application services. He says he doesn't insist on performance guarantees in his contracts, because most ASPs are so new to the game, they will do anything to get and hold on to customers. "It's easy for me to get extremely top-level service," he says.

But didn't he check out Cephren in advance regarding things such as security and data backup? "I have to assume that with today's encryption and firewalls, that if they can't figure it out, I sure as hell can't figure it out," he says.

Half the ASPs are going to fail, so you better spend time placing a good bet.

AUDREY APFEL, ANALYST, GARTNER GROUP INC.



MARC BERLOW

JON DELL'ANTONIA: OshKosh B'Gosh's ASP problems were "like the Three Stooges and the Keystone Cops combined. . . . But we were not laughing"

"Far and away, the most important thing is to get reference accounts," says Art Williams, an analyst at Giga Information Group Inc. in Cambridge, Mass. Next comes the suitability of the application and the financial viability of the ASP; technical considerations are way down the list, he says.

ASPs "tend to be long on technical depth and short on business sense," Williams says. "The field is full of techies who really know what they are doing." He advises, however, that customers ask for a user advocate — "a single person within the ASP who's measured on keeping the customer happy."

Customization Counts

Like Fischbach & Moore, eVinyard Inc. in Portland, Ore., is similarly blasé about technical details such as an ASP's backup, recovery and security procedures. "These things are a basic entry point," says Michael Osborn, vice president of sales and technology at eVinyard.

EVinyard is another Pandesic alumnus in search of a new ASP, and the online wine merchant is likely to go with Intel Corp.'s Intel Online Services (IOS), Osborn says. The ASP is attractive, he says, because of its "world-class network-operations centers," its intimate knowledge of SQL — on which eVinyard's applications are based — and the around-the-clock on-site presence of Intel technicians and representatives of major hardware and software vendors. Osborn says that by clustering redundant computers and disk drives, IOS can offer a 100% uptime guarantee.

But what's most compelling to Osborn about the service, he says, is Intel's ability to tailor its problem response to customer specifications. "They will do anything we say in response to a logged activity such as an error message," he says. "For example, we may just want them to notify us when a server is down — just make a phone call. In other cases, we may want them to do everything they can to get it back up."

This kind of flexibility is critical in a rapidly growing and evolving electronic business, Osborn says. "We know their procedures, and they can be modified collaboratively. It's the ability for us to access — and help build — the run book for every discrete process," he says.

Dell'Antonia at OshKosh B'Gosh says he will make sure he thoroughly understands his next ASP's run book. "Something we'll be asking for this time is for them to define staffing levels in the [hosting] facility and how they really operate it," he says. "Do you actually have people there physically all the time, and how quick can we get someone in there if it's a problem you are not going to work on?" And he says he will insist on the right to make surprise visits to the ASP's data center.

Dell'Antonia says he will also ask more probing questions about the spare parts and equipment that are kept on-site, the average time it takes to make repairs and the location of repair people.

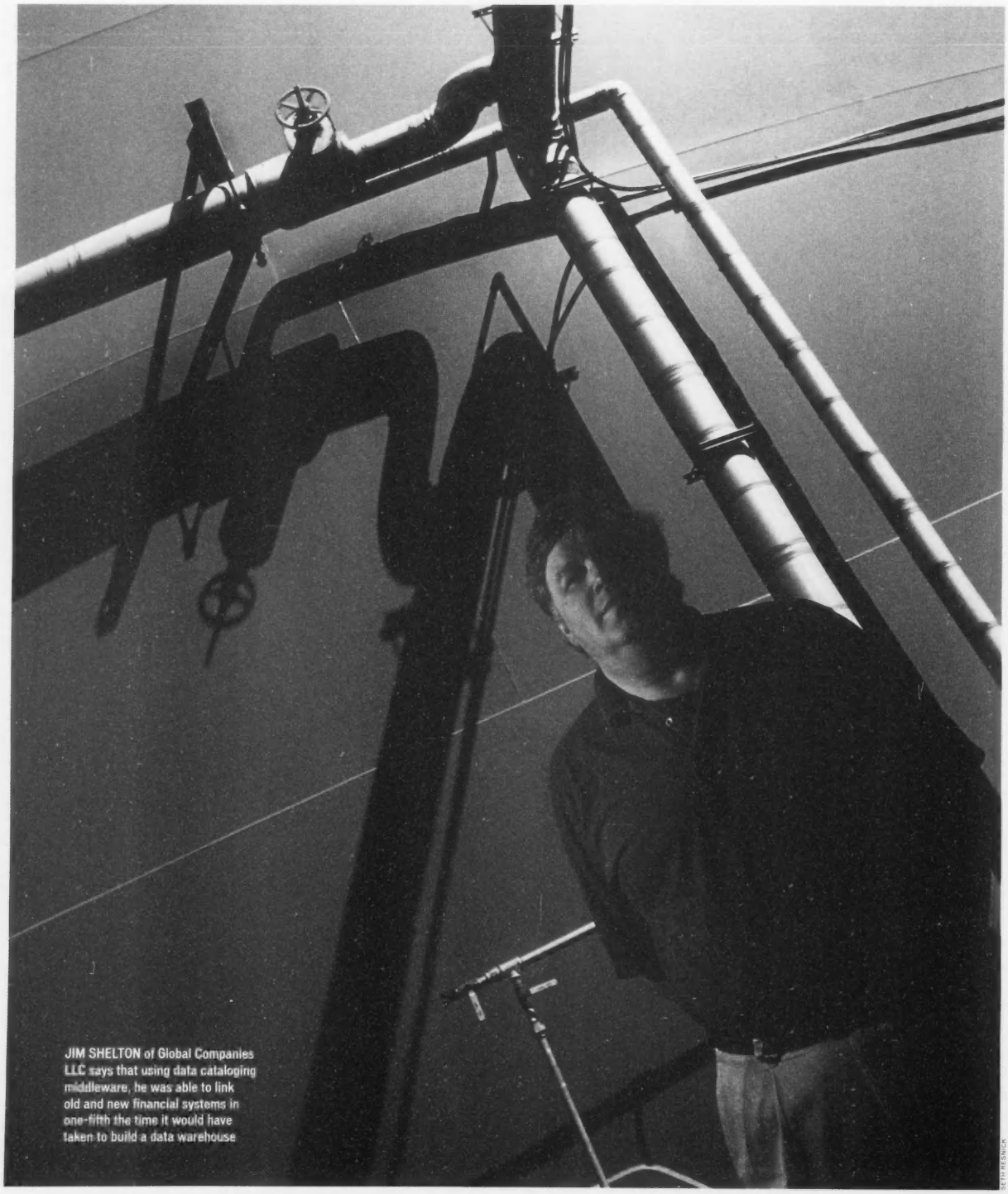
Gartner Group's Apfel says that's precisely the right approach. "The biggest pitfall is assuming the ASP offers what you need, when what they are offering is whatever they cooked up in the bar the night before," Apfel says. "They are going to try things. ASPs' business models are changing week by week."

Apfel advises users to carefully examine and document their needs before going to an ASP. "It doesn't matter what's in the contract they hand you," she says. "Make sure you have your own independent list of exactly what you need." ◗

Ten Questions To Ask an ASP

1. Will you provide at least three reference accounts that can tell us about your technical and service capabilities?
2. What level of system availability do you guarantee, and how do you measure it? What penalties will you accept if you fail to meet that goal?
3. What provisions have you made for security, data backup and disaster recovery?
4. What are the capabilities and certifications of your technical-support operations and employees?
5. What are your hiring and training practices? And what strategies do you have for retaining your technical people – and their knowledge of my needs?
6. What levels of personnel are at the hosting site? When are they there? And how quickly can we get access to the site?
7. What plans have you made to add computer and network capacity, and how quickly will you provide it?
8. To what extent can we help write your run book to tailor your response to problems and events?
9. What are your equipment repair capabilities, procedures and time frames, and what spare parts do you keep on-site?
10. Will you assign a customer advocate and a technical liaison to our account?

AVOIDING ASP ANGST



JIM SHELTON of Global Companies LLC says that using data cataloging middleware, he was able to link old and new financial systems in one-fifth the time it would have taken to build a data warehouse

SETH RESNICK

Calling All Data

For years, IT managers have searched for ways to give users any data they want, anytime they want it, from any database. With some new tools, that dream is coming closer. By Robert L. Scheier

JIM SHELTON looked the data-warehouse monster in the eye and blinked. And he says he's glad he did. In late 1998, Shelton, the director of information systems at Global Companies LLC in Waltham, Mass., says he considered building a data warehouse to share data between the Lawson Software financial applications his petroleum-distribution firm was phasing out and the new Oracle Corp. financial applications it was embracing.

But he says he knew how expensive and time-consuming it could be to pluck just the data his users needed from the proprietary flat-file database associated with the applications from Minneapolis-based Lawson and to move that data to a data warehouse in a form that could be accessed by the newer Oracle relational database. In addition, updating all that data fast enough to reflect volatile shifts in petroleum pricing and inventory would be a logistical nightmare.

By using a new type of middleware — call it data cataloging — to link the two systems, Shelton figures he's spent one-fifth of the time it would have taken to build a data warehouse. What's more, "Within a couple of days, we were producing data and producing reports that did joins between the Oracle data and the mainframe," compared with the months or years it would have taken to build a data warehouse.

Shelton used Metagon Technologies LLC's DQbroker, one of a growing number of tools that sidestep the cumbersome, time-consuming and politically charged process of extracting data from live production databases and storing it in warehouses where it can be queried and analyzed. Rather than moving the required data to a physical warehouse, software such as DQbroker creates a "catalog" of the data and lets users "order" just the data they need when they need it.

Share and Share Alike

Sharing data among incompatible databases is important enough when, say, accounts receivable needs a daily update from sales to send out the bills or when accounting needs sales data from four subsidiaries to close the quarterly books. It becomes even more important when companies need to buy and sell instantly over the Web.

While different vendors take different approaches, the aim is to let business users find the data they need in a data catalog and order it. The catalog consists of metadata about a database — identifying a data source, describing which tables and columns are available to be queried and even details such as whether customers are identified by number or by a string of text such as a name.

The metadata is used to direct queries to the proper database and translate queries into the specific format the target database can understand. While some data still must be moved from production databases to users and some may be stored along with the metadata catalog, this approach is often less expensive and time-consuming than building and restocking a full-fledged warehouse.

Peers Helping Peers

While most middleware tools create a central hub to catalog information and translate among the various database dialects, Matthews, N.C.-based Metagon scatters these functions among object brokers, one of which runs on every database platform in the system. Each broker is a peer, meaning it can do data-retrieval work for other nodes or ask other nodes to retrieve data for it.

By dividing up the jobs, DQbroker works more quickly than competing approaches, delivering small amounts of data from some nodes to the user while other nodes are still performing their queries, says David Brower, director of research and development at Metagon. This approach also reduces the amount of data moving over the network, he says, making it easier to scale the system by simply adding more brokers to a single node or creating new databases with an associated broker.

Perhaps Metagon's most important claim, though, is its ability to provide seamless access to any database, from mainframe Cobol applications to popular relational databases such as those of Oracle Corp. and Sybase Inc., and even Excel spreadsheet files.

Once installed on the database, the broker begins collecting information about the associated database and maintains that metadata locally. It also translates queries between database formats, says Brower.

How well does it work? Well enough that Shelton was able to link not only his Unisys Corp. and Oracle databases, but also a database server from Sybase in Emeryville, Calif., and an in-house custom application for less than $100,000. It took three days of consultant time to get the links up and running. Shelton's needs are fairly modest: a maximum of 15 concurrent users, accessing several hundred predefined reports processed each night. But the process of giving users access to new tables using DQbroker "is almost akin to drag-and-drop," he says. "When we

Calling All Data

look at places where we need to do integration between systems, we look at DQbroker first."

Getting Attuned

The same challenge confronted an information technology manager at a large distribution company. The IT manager, who declined to be identified, needed to link a legacy Cobol enterprise resource planning system running on a Tandem Computers Inc. fault-tolerant computer with a new SAP R/3 implementation running on an IBM AS/400 and DB2.

"When you run an [inventory-based] business, you need to keep your systems in sync" during such a transition, says the manager.

His company also needed timely information so it could do business over the Web, giving its partners browser-accessible updates about such things as order status. As for data warehouses, the manager snorted, "We don't have time to sit down and redesign a data warehouse for [every] special need" identified by business managers.

After considering several approaches, including IBM's MQSeries messaging middleware and Microsoft Corp.'s BizTalk server, the IT manager chose Attunity Connect from Attunity Inc. in Burlington, Mass., formerly ISG International Software Group Ltd., which had sold the product as ISG Navigator. He says he was sold on the combination of Attunity Connect, the "plumbing" to link the actual databases, and Attunity B2B software, which holds the business rules that determine how data is transformed between the Tandem and R/3 systems.

MQSeries lacked the extensive business-rules engine that Attunity B2B offered, and it wasn't as compatible with other platforms as Attunity, says the manager. BizTalk lost out, he says, because "it's Windows-oriented" and would require a lot of extra development to meet his needs.

The manager says he planned to complete prototype over the summer and launch a pilot system this fall. His biggest surprise so far? "That we found a product that can connect and talk to all those different technologies in a really, really easy way," he says.

Garlic, Anyone?

Don't look for Garlic in any IBM product list — it's middleware technology built into Version 7 of IBM's DB2 database and Version 2 of its DataJoiner database-connectivity software.

In Garlic, the metadata catalog takes the form of "wrappers" — software that describes the data in the remote database, translates commands between the DB2 query engine and the target databases and helps the query engine determine the fastest way to execute the query.

Because the wrappers also know how each database processes queries, such as the number of tables that can be accessed per query, DB2's query-processing engine "can decide the best way to process that request," says Jim Kleewein, a member of the senior technical staff at IBM's Silicon Valley Laboratory in San Jose. Like other competing technologies, Garlic can also cache some of the data itself to speed the retrieval process.

Currently, within DB2, IBM provides wrappers only for its own DB2 database and Oracle. With DataJoiner, users can view several other relational databases, says Laura Haas, a research manager at IBM's research center in Almaden, Calif. In the next major release of DB2, expected sometime next year, many of the data-access capabilities now found in DataJoiner will be incorporated into DB2, she says.

For now, IBM is doing most of the wrapper-writing itself, as with its Discovery Link package of products and services for helping scientists track and categorize human genes. IBM also plans to publish an application programming interface to let outside developers write their own wrappers.

If Garlic is currently limited in its support for outside databases, its strength "is the extent to which the wrapper participates in the query-planning process," says Kleewein, "and the extent to which our wrappers have correctly modeled the behavior of the underlying [data] sources."

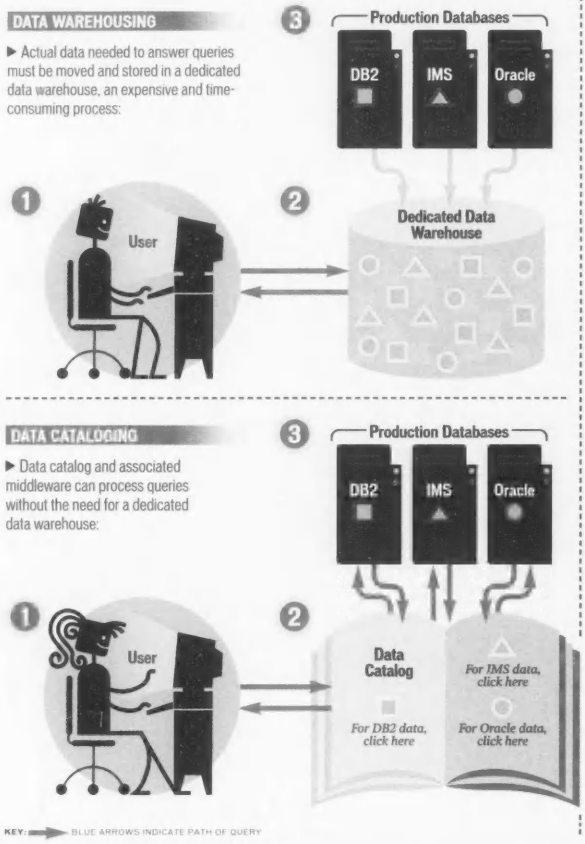
As a result, says Haas, "We do a much better job of query optimization than any of the competition."

For business users, though, the real value of these new tools lies in that they let business users analyze their data with off-the-shelf query tools, without having to know or care where the data resides. Which is just what Shelton and other IT managers say they want. ◗

Freelance writer Robert L. Scheier, formerly Computerworld's *technology editor, can be reached at rscheier@charter.net.*

No More Data Warehouses?

Instead of moving corporate information into a special warehouse, data catalogs list the data available to users and let them "order" what information they need.



SOURCE: INTERVIEWS WITH COMPANY OFFICIALS

A Crop of Data Catalog Tools

Attunity Inc.'s Attunity Connect: Application-level middleware aimed at synchronous (real-time) information sharing. Provides metadata catalog and native links to target databases for greater performance and flexibility.

IBM's Garlic: Database middleware available only in IBM's DB2 Version 7 and DataJoiner Version 2. Uses "wrappers" to describe data types and specific database implementations to the DB2 query engine. IBM claims Garlic does better query optimization than competitors. Limited support for databases other than DB2 and Oracle.

Metagon Technologies LLC's DQbroker: Peer-to-peer, object-oriented middleware distributes metadata storage, query translation and query processing among "nodes" on each database. Metagon claims that it can access any data from mainframe Cobol applications to Excel spreadsheets.

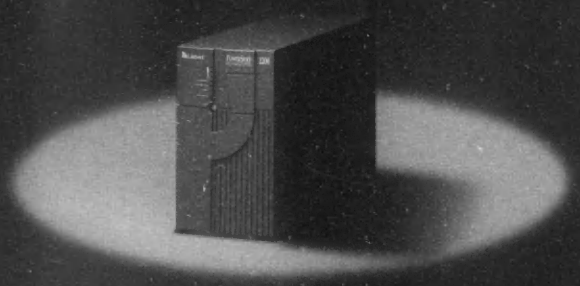
Oracle Corp.'s Transparent Gateways: Based on Attunity Connect, the gateways support access to more than 40 non-Oracle data sources including DB2, Sybase and Microsoft SQL Server. Among other functions, the gateway translates queries among SQL dialects and caches frequently used queries for greater performance. Built into Oracle8i.

Sybase Inc.'s Enterprise Connect Data Access: Provides a catalog of data and application objects available within the enterprise. In addition to accessing data, users can launch applications and stored procedures from the catalog. Because of the object-oriented nature of the catalog, Sybase claims, developers can work with the objects using a variety of development tools including C, C++ or Java.

MOREONLINE

For more information about data warehousing, visit our Web site: **www.computerworld.com/more**

Small-scale UPS quality that makes you say, "Wow."



A pricetag that makes you say, "How?"

PowerSure® Direct

The experts who brought you 1,000,000 hours MTBF UPS reliability have found a way to reduce the price you'd expect to pay for a small-scale UPS by up to 20 percent. How do we do it? It's simple – we allow you to buy manufacturer-direct through the Liebert website.

And while the pricetag is low, the quality is not. The expertise that has made Liebert an industry leader in 3-phase power protection for over 30 years has been engineered into our 300-2200 VA PowerSure UPSs. You can get a full-featured UPS, with 12 minutes back-up battery at typical load, buck and boost voltage circuit, and multiple outlets for clustered equipment. You're also backed by Liebert's worldwide support and service.

That's how we put the wow in each PowerSure UPS. Visit www.liebert.com for complete product specification and ordering information.

® 2000 Liebert Corporation. All rights reserved throughout the world. Specifications subject to change without notice.
All names referred to are trademarks or registered trademarks of their respective owners.

Liebert®
KEEPING BUSINESS IN BUSINESS.®

800-230-5790 dept. PS1
www.ps1.liebert.com
info@liebert.com

IP Multicasting

BY PETE LOSHIN

IN THE WORLD of Internet Protocol Version 4 (IPv4), you can send data packets to three different types of destination addresses: unicast, broadcast and multicast. The majority of Internet traffic today is unicast, meaning that an address targets a single destination host. In other words, if you send a packet to that address, it will be received by a single computer.

There are also broadcast addresses, which are, by IP convention, interpreted to mean "all hosts connected to *this* network" rather than to any single host. Send a packet to a broadcast address and it will be delivered to every host connected to the network specified by the address.

Unicast is great — it's what lets you connect your browser to your favorite Web sites, download files and do most of what gets done on the Internet. But it tends to be limiting — you can communicate with only one host at a time. Operators of a Web site providing streaming video might prefer to send out those streams once and have lots of people receive them, instead of managing the overhead of sending out a separate stream to each viewer.

Broadcast might seem to be a good solution, since your packets get sent out only once and could, in theory, be delivered to every host on the Internet, but in practice, broadcast solutions are generally frowned upon. Back in the early days of the Internet (the late 1970s and early 1980s), broadcast was thought to be a good way to propagate network information. But broadcasts crowd out other kinds of traffic, even when they're used only on a single network or subnet; all-Internet broadcasts were ruled out early on.

To get your packets to many recipients, IP multicasting is the way to go. IPv4 Class D addresses (those with values in the range of 224.0.0.0 through 239.255.255.255) are reserved for multicast use. Each address can be associated with a multicast group. To receive data sent to that address, you must join the group. This also works for many-to-many communications, since every group member can originate packets.

DEFINITION

IP multicasting is a method of delivering a single packet, sent only once by the source host, to multiple destination hosts that may be connected to scattered subnets.

Becoming a Member

To join a group, notify your nearest multicast-enabled router, which puts you on its list of group members. When the router sees a packet addressed to your group's multicast address, it forwards the packet to you and anyone else in the group served by that router.

Routing IP multicast packets makes unicast routing — getting a unicast packet from its source to its destination, across a constantly changing landscape of interconnected networks — look like child's play. The idea is to try to minimize duplication, which wastes bandwidth, while also ensuring that all members of the group get all the multicast packets. And, of course, those packets should all be delivered in a timely fashion.

Implementers have been working on scalable multicast-routing solutions for years. Multicast-routing strategies depend on whether the distribution of group members is dense (where most network hosts are multicast group members) or sparse (where most hosts aren't multicast group members).

The basic strategy for dense-mode multicast routing is "flooding": All multicast-enabled routers receiving a multicast packet just retransmit the packet on all their networks except the one from which they received the packet. This way, all routers eventually see all multicast packets. Of course, this approach presents scalability problems because it generates a lot of traffic.

The basic strategy for sparse-mode multicast routing is to avoid sending routers multiple copies of the same packet and to try to send multicast packets only to routers that serve group members.

Not Quite Perfect

Multicasting does have some drawbacks. It's connectionless, which means you can't easily set up reliable streams of data, such as with Transmission Control Protocol. Multicasting uses the less-reliable User Datagram Protocol by default.

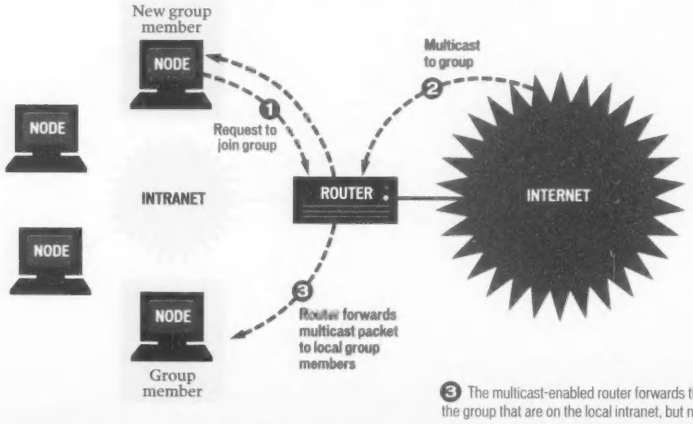
The biggest problem is that few Internet service providers are set up to handle multicast packets, which is a shame, since multicasting can enable so many interesting applications. For example, the Internet Engineering Task Force has long used the Mbone — a multicast backbone — to broadcast its events. Multicasting can also reduce some of the overhead associated with voice and videoconferencing across the Web.

The IP Multicast Initiative (IPMI), a self-described "worldwide, multivendor forum accelerating the adoption of IP Multicast," lists providers that offer multicast services. The short list includes leading providers such as AboveNet Communications Inc. in San Francisco, UUnet Technologies Inc. in Ashburn, Va., and Sprint Corp.

Though not yet a runaway success, multicasting still has great potential. According to a white paper published by the IPMI, Intel Corp. began using multicasting in 1996 to transmit events such as product announcements and demonstrations. At the same time, Microsoft Corp. started to make executive speeches as well as local radio, MSNBC and BBC broadcasts available via multicasting.

Loshin is a freelance writer in Arlington, Mass.

Multicasting in Action



This figure shows the Internet on the right and an intranet with a multicast-enabled router on the left. The router is connected to the intranet and the Internet. The intranet contains several hosts, one of which is already a member of a multicast group; another is about to become a member of the group.

1 This arrow links a node that isn't already a member of a multicast group and the local multicast-enabled router. The packet sent is a request to be included in the group, sent to its local multicast-enabled router.

2 A packet arrives at the local multicast-enabled router from the Internet, addressed to that multicast group.

3 The multicast-enabled router forwards the multicast packet to both members of the group that are on the local intranet, but not to any other nodes on that network.

Are there technologies or issues you would like to learn about in QuickStudy? Please send your ideas to quickstudy@computerworld.com.

RUB TWO STICKS TOGETHER...

YOU GET FIRE.

RUB TWO TECHNOLOGY TITANS TOGETHER...

YOU GET AN INDUSTRY DYNAMO.

USE US TO MOBILIZE YOUR BUSINESS...

YOU GET MORE CUSTOMERS.

TO LEARN HOW M-BUSINESS IMPROVES PRODUCTIVITY, SHORTENS CUSTOMER RESPONSE TIME AND ENHANCES THE BOTTOM LINE, STOP BY FOR A VISIT.

AND DON'T MISS M-BUSINESS 101 – AN EXECUTIVE SEMINAR AND WORKSHOP SERIES NOW TAKING PLACE IN A CITY NEAR YOU. REGISTER TODAY AT...

WWW.WIRELESSKNOWLEDGE.COM

A MICROSOFT AND QUALCOMM COMPANY

Start-up ViaFone.com Gives Sites a WAP

Company offers fast installation of wireless application support for Web sites

BY AMY HELEN JOHNSON

GETTING A wireless application up and running quickly is the specialty of application service provider (ASP) ViaFone.com Inc. in Redwood City, Calif. And speed was what John McDowall, chief technology officer at Santa Clara, Calif.-based mySimon Inc., wanted.

MySimon is a buying guide for Internet shoppers — what to buy and where to buy it online. It has a large Web site that dishes out this information on demand. The flaw in that design, explains McDowall, is "the vast majority of the users are not at their PC when they make a buying decision."

Fast Action

McDowall wanted a wireless application that would put mySimon information on cell phones and handhelds, serving those shoppers who are standing in the middle of Baby Gap wondering, "Hmmm, can I get rompers for less on the Internet?" And he wanted it fast.

ViaFone delivered in five weeks, McDowall says. A Web address, *http://wap.mysimon.com*, sends visitors to ViaFone's servers. ViaFone caches the main pages of mySimon.com and the site's hierarchy. When queries come, it sends an HTTP request to mySimon, accepts XML data in return, then converts it into an appropriate format for the user's wireless device. ViaFone includes support for BlackBerry handhelds from Waterloo, Ontario-based Research In Motion Ltd. and Palm OS handhelds.

Wireless applications have a strong future. International Data Corp. (IDC) in Framingham, Mass., projects a 93.7% compound annual growth in the use of smart phones. Also, by year's end, all digital phones shipping will support the Wireless Application Protocol (WAP), according to IDC.

ViaFone CEO Bernard Desarnauts says what made mySimon's five-week time frame possible is that ViaFone has an integrated set of development tools and delivery services that understand the ins and outs of various mobile device interfaces and wireless bandwidth considerations as well as how to communicate with back-end business applications like enterprise resource planning and customer relationship management packages.

ViaFone is set up so that someone with knowledge of only markup languages can design a wireless application, says Desarnauts. "We want to minimize the resources to build, deploy and maintain wireless applications," he says.

An advantage that ViaFone delivers, says Ken Smiley, a senior industry analyst at Giga Information Group Inc. in Cambridge, Mass., is that it's technology-agnostic. The company is willing to work with all carriers, all types of connections and all kinds of enterprise systems. "I think that is an advantage long term in that market space," he says.

Possible Problems

One potential pitfall for ViaFone, Smiley says, is that the task of mobilizing enterprise applications is difficult.

"I don't believe that it's as easy, quick or inexpensive as people are led to believe by the marketing hype," he cautions.

That's led a lot of potential customers for ViaFone to wait for leading vendors to emerge with a proven product. The bad news for ViaFone is that it needs big clients to prove that its approach works and to pump some needed practical experience into the company.

Although ViaFone's client list contains some well-known names, not all of them are currently fully committed to wireless. McDowall describes his company's project, which accounts for less than 5% of the site's traffic, as an experiment.

"We want to get into this space, understand the technology and understand what users like and don't like," he says.

ViaFone has released a beta version of a software development kit, OneBridge Mobility Platform, that lets companies build and host their own mobile-enabled Web sites.

Smiley says a two-pronged approach — development platform and ASP — is a good move because customers want different things. But for a small company like ViaFone, maintaining growth and momentum on two fronts may be difficult, he warns.

The company expects revenue from OneBridge to grow to 80% of sales, says Desarnauts. Currently, all revenue comes from ViaFone's hosted services, which were launched in May. While ViaFone declined to provide actual revenue numbers, Desarnauts projects revenue this year in the seven-figure range. ◗

Johnson is a freelance writer in Seattle.

JOHN HARDING

VIAFONE CO-FOUNDERS (from left) Bernard Desarnauts, Josh Stein and Fernando Ruarte

ViaFone Inc.

Location: 2000 Bridge Parkway, Suite 203, Redwood City, Calif. 94065

Telephone: (650) 413-5550

Web: *www.viafone.com*

The technology: Wireless application service provider and development platform

Why it's worth watching: The service is fast to implement and works with many wireless services, back-end systems and data connections.

Company officers:
- Bernard Desarnauts, CEO and co-founder
- Josh Stein, vice president of business development and co-founder
- Fernando Ruarte, vice president of engineering and co-founder

Milestones:
- September 1999: Founded
- May 2000: ASP launched
- Sept. 2000: Development product released as beta

Employees: 62; 105% annual growth rate projected

Burn money: $11 million from Draper Fisher Jurvetson and Partech International Inc., plus angel funding

Products/pricing: ViaFone OneBridge Mobility Platform (in beta); starts at $100,000

Services/pricing: ViaFone Mobile Application Server; starts at $150,000 per year

Customers: mySimon.com, CDnow Online Inc., Ticketmaster Online-Citysearch Inc.

Partner: iXL Inc.

Red flags for IT:
- With so much competition, will ViaFone be a survivor?
- Are enough customers demanding wireless to justify the cost?

COMPUTERWORLD emerging companies

the buzz
STATE OF THE MARKET

Join the Crowd

Analysts say the big job for ViaFone is distinguishing itself from the dozens of other vendors claiming to have a wireless application product or service. Carl Zetie, an analyst at Giga Information Group, says that in addition to vendors like ViaFone that come at the problem from the wireless end of things, ASPs are adding wireless capabilities to their offerings, hoping to capture that emerging business.

Giga analyst Ken Smiley says he sees two approaches being offered by vendors. One is content aggregation, in which data is sent between back-end stores and the mobile device. In this situation, content is static. A much harder problem is mobilizing applications so that mobile devices interact with back ends the same way that desktops do, by building mobile applications that change data and perform transactions.

Companies are pretty clear on the types of applications they want to mobilize, says Smiley. At the top of the list is the backbone of corporate communications: e-mail, contacts and scheduling. Next comes sales-force automation and inventory tracking, followed by help desk or customer service applications.

It's far too early to tell if ViaFone can pull ahead of the competition, says Smiley. "They could make a name for themselves, or they could fade away," he says. Not only is that true of ViaFone, he adds, but also of anyone else in this new field.

AvantGo Inc.
San Mateo, Calif.
www.avantgo.com

AvantGo is adopting the same dual-pronged approach as ViaFone – both internal development tools and a hosted service. It also has more than 1,000 partners that have built channels that feed information to wireless devices.

Everypath Inc.
Santa Clara, Calif.
www.everypath.com

Purely a hosted service, Everypath acts as a middleman between a Web site and wireless devices, essentially replicating the customer's Web site for mobile users. It supports transactions such as purchasing goods and auctions.

NetMorf Inc.
Boston
www.netmorf.com

SiteMorfer is an XML-based development and server platform for e-commerce that focuses more on integration with back-end corporate databases.

Winsurf Mainframe Access

The Complete Web-To-Host Connectivity Tool.

IBM 390, AS400, DEC/UNIX, Bull Access

Auto Deployment

Rejuvenation Tools

Automatic HTML Conversion

SSL/TLS Security HTTPS

Usage Metering
Concurrent User Pricing

"WMA, at present, is the most inclusive, best rounded 'all-in-one' Web-to-host offering on the market."
© ***Anura Gurugé***, *August 2000*

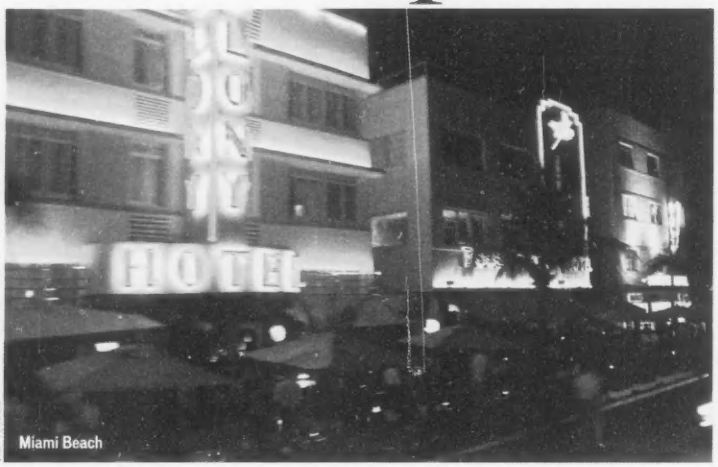
www.icominfo.com/cw

ICOM INFORMATICS

Contact ICOM Informatics today for a free eval copy of the most complete web-to-host offering on the market.

FRANCE	DEUTSCHLAND	UNITED KINGDOM	USA
ICOM Informatique	**ICOM Informatics**	**ICOM Informatics**	**ICOM Informatics**
18, avenue Winston Churchill	Stefan-George-Ring 29	Exchange House, 494 Midsummer Bld.	11824 Jollyville Road - Suite 500
F-94227 Charenton Cedex	D-81929 München	Central Milton Keynes MK9 2EA	Austin, TX 78759
Tel.: 33 (0) 1 46 76 45 50	Tel.: 49 (0) 89 930 861 50	Tel.: 44 (0) 1908 677616	Tel.: 1 512 335 8200
Fax: 33 (0) 1 46 76 45 59	Fax: 49 (0) 89 930 5184	Fax: 44 (0) 1908 670013	Fax: 1 512 335 9110
http://www.icominfo.fr	http://www.icominfo.com	http://www.icominfo.com	http://www.icominfo.com/cw

South Florida Turns Up the Heat



Miami Beach

With Internet development skyrocketing and South American trade flourishing, the demand for IT workers is hitting an all-time high on the Sunshine State's southern shores. By Erik Sherman

FLORIDA has developed a reputation for having four industries: real estate, sunbathing, oranges and Mickey Mouse. Parts of the state are trying to counter those perceptions with "silicon" monikers. That includes southern Florida, which alternates between Silicon Beach and the Internet Coast.

Internet-related ventures here have been successful in obtaining one of the few network access points in the country, and there's growing potential for information technology professionals to find their place in the sun. But depending on your current location, you might find that the environment could burn your wallet as well as your skin.

Business Climate

There are certainly plenty of corporations needing IT help. A survey of central Florida alone, conducted by the University of South Florida in Tampa, shows a need for 11,000 more high-tech workers by 2003.

The American Electronics Association (AEA) and the Nasdaq Stock Market Inc. rank the state as sixth in high-tech employment and seventh in the number of job increases in the sector. There are also large corporations in the state.

CSX Technology Inc., one of the six largest railroads in the U.S., has an IT staff of 600 in Jacksonville. Arthur Andersen LLP has a major global IT center in Miami, while Tampa is home to PricewaterhouseCoopers' main training center.

IBM and Harris Corp. are longtime residents, and there are many government and aerospace opportunities near Cape Canaveral. Growth has been strong in Internet-related companies throughout the state.

"There are more than 5,000 computer and Internet and communication service companies in Broward and Palm Beach counties today," and that comprises a small part of the state, according to Ann Salamone, CEO of Enterprise Development Corp. in Boca Raton.

Southern Florida has also become a strategic location for companies looking to do business in Latin America. Startups will continue to flourish in the medium term "just because the other markets are very saturated and competitive for the venture capitalists," says Jeff White, senior vice president and manager at the West Palm Beach office of Silicon Valley Bank, a Santa Clara, Calif.-based commercial bank that invests primarily in the IT sector.

Yet, not all is rosy. The AEA ranking also shows that the number of high-tech employees, as a percentage of private-sector workers, in Florida is 20% below the national average. Although the absolute number of job increases was high, the percentage was also below the national average.

Agriculture and tourism are "still probably the majority" of businesses in the state, says Guy Hagen, assistant director of economic development at the University of South Florida.

Strong Job Market

Nonetheless, Florida has a good job market. "It's not different than it is for us in Philadelphia or Atlanta or New York," says Ted Fernandez, CEO of Miami-based Answerthink, which has offices in these other cities. "There's a fight for experienced talent."

Rapid growth means there's also a particularly strong need for IT directors and others with project management experience. Also needed are Web developers, database experts and people with experience in enterprise application integration.

According to Wayne Coonan, national accounts director at MRI Tampa Corporate Offices, Cisco experts with Cisco Certified Internetwork Expert ratings and Solaris gurus are also in hot demand, as are people who understand how systems can work together.

"A [job] title that we had a need for [was] an IT architect — an individual who can come in and really help us design and . . . make sure we are doing the right things moving forward," says Jack Morgan, assistant vice president of human resources at CSX.

Although demand for IT workers may be strong, don't expect to make the same money the market in other states offer. Salaries are "clearly 10% less than the national mean," says Dan Smith, managing partner at MRI Tampa.

"[Compared with] the higher-cost markets like LA and Boston, we're probably 20% or 25% lower," says Smith. In addition, the cost of living is probably right at the national average. There is no state or local income tax, but there are sales taxes and other charges.

"We talk of ourselves being a lower cost-of-living state, but we're not," Smith adds. "We're nickel-and-dimed on many things, like toll roads."

However, if someone enjoys outdoor activities, fine dining, cultural activities and night life, there may be a spot in the state to soothe cash-flow cramps. Schools are "not bad," says Jan Nelson, director of global services at Newburyport, Mass., relocation firm Mobility Services International Inc. "But in terms of comparative merits, they wouldn't rank as high as schools in California and the Northeast," Nelson says.

IT workers relocating to Florida from other parts of the country may have some adjustments to make.

John McVey, an IT architect at CSX, has twice relocated from Pennsylvania. "The South has a stereotype of moving a little slower than the North," McVey says. "I wouldn't say that's necessarily true."

A fast-growing population can also make it easier to fit in. "There's a number of growing communities, and that has put people in many instances in a similar situation, where they're all relatively new to the area, and there's more of a sense of community than in well-established Northern communities, where people have been living there for generations and you have to break in, and its difficult," says McVey.

In general, though, people from certain areas of the country will find relocating to Florida easy to adapt to.

"Florida works well for people transferring in from the West Coast. People are delighted because of the much lower costs of real estate and the many choices they have," says Nelson.

Sherman is a freelance writer in Marshfield, Mass.

Have you been the victim of dirty birds?

Get Maryville Technologies. If you've been dumped on by "body shops" portraying themselves as system integrators, or big consulting companies "reengineering" your molehills into mountains, let Maryville Technologies help you avoid another mess. In an industry filled with pigeons, we are uniquely trusted by our clients to architect and deliver solutions that meet complex enterprise needs. For integrity, reliability, scalability and performance...get Maryville Technologies. *www.maryville.com*

Maryville™
TECHNOLOGIES

Enabling Enterprise Performance™

1.800.500.1103

Help wanted:
3,500 high-tech jobs

The tech industry moves fast. And so do we.

Nwjobspace.com is your direct link to the hottest high-tech jobs in the Puget Sound region — with hundreds of new tech jobs posted daily from The Seattle Times and Seattle Post-Intelligencer newspapers and more than 100 featured Northwest employers.

Our region is a mecca for tech industries —and no one knows it better than we do. Nwjobspace.com is local, knowledgeable and the only job search site you'll need.

nwjobspace.com

A Service of The Seattle Times Company

KAISER PERMANENTE®

Tomorrow: a cure
Today: the IT infrastructure that it's founded on

What matters most? Your family, your work. Your health. Today, everywhere you look, technology is making the difference in all these areas. At Kaiser Permanente, we're dedicated to enhancing health care delivery through state of the art information tools. And the 3,500 experts at Kaiser Permanente IT are at the heart of that mission. Getting life saving information where it needs to go. Talk about mission critical, target Kaiser IT.

Bring your expertise to Kaiser Permanente today in one of the following disciplines. Become involved in exciting initiatives such as Web development, extranet, intranet, enterprise data security solutions, network planning, client/server-based projects, network infrastructure, project management and technology planning.

Position Locations:
California, Colorado, Georgia, Hawaii, Maryland, Ohio, Oregon, and Washington D.C.

PC LAN
Seeking field technicians, administrators, desktop support specialists, LAN consultants and analysts with expertise in NT, Novell, TCP/IP, Lotus Notes, MS Exchange/Messaging, e-mail, LAN and WAN.

NETWORKING
Seeking administrators, consultants, WAN engineers, network design analysts and security consultants with expertise in UNIX®, Cisco hubs, routers, bridges, switches, Fast Ethernet, Token Ring, Frame Relay, ATM, AVR and Telephony.

TELECOMMUNICATIONS
Seeking analysts, consultants, software technical specialists and project managers with expertise in UNIX, Cisco hubs, routers, bridges, switches, voice, data, IVR, CTI, ACD, PBX, Nortel Passport, ATM, Frame Relay and Call Center.

DATABASE ADMINISTRATION
Seeking professionals with experience in a large, complex multi-vendor database environment who possess skills in any of the following: Oracle, DB2, Sybase, IMS, physical database design, DBMS utilities in UNIX or MVS environments; O-O methods preferred.

DATA ANALYSIS
Seeking professionals with experience in logical database design, data modeling/Entity-Relationship diagramming, meta-data management and ERWin/Platinum; O-O methods preferred.

DATA WAREHOUSING
Seeking professionals with experience in Oracle, Essbase, Business Objects (Sequent a plus), data warehouse design and data transformation/extraction.

APPLICATIONS DEVELOPMENT
Seeking programmer analysts, systems programmers, systems analysts, application developers, group leads and operations specialists with expertise in PowerBuilder, C++, C, Visual Basic, Sybase, Oracle, UNIX, IEF/Composer, COOL:Gen, ADS Plus, MUMPS, SAS, EDI, MQ, OBDC, OCC, Corba, COBOL, COBOL II, JCL, MVS, DB2, CICS, Model 204, IMS, MANTIS, Pega Systems, Tandem, TAL, DEC/VAX/VMS, PeopleSoft and Tesseract.

BUSINESS ANALYSIS/ PROJECT MANAGEMENT
Seeking analysts, consultants and project managers to oversee projects utilizing MS Project with expertise in planning and implementation within an IT environment.

WEB DEVELOPMENT
Seeking senior Web developers to develop Web applications using Java™, application servers, and Oracle in a UNIX environment.

SOFTWARE ENGINEERING/ SYSTEMS ARCHITECTURE
Seeking expertise in emerging technologies for enterprise systems on an O-O or UNIX platform.

LOTUS NOTES ADMINISTRATION/DEVELOPMENT
Seeking administrators with experience in large-scale Notes infrastructure. Experience with R5, Domino 4.X or higher, hands-on administration, troubleshooting, replication, mail routing, calendar and scheduling problems. Development candidates should possess strong Lotus Script and NT expertise.

TECH WRITING/INSTRUCTIONAL DESIGN
Seeking experts in Adobe Illustrator®, Microsoft Office Suite, HTML and Visio.

UNIX SYSTEM ADMINISTRATORS
Seeking UNIX System Administrators with at least 3 years of system administration experience in AIX and/or Solaris™.

Find out more about Kaiser Permanente Information Technology by visiting **www.kp.org/jobs**; click on "IT Division" tab. **Submit one resume only**, referencing **Job Code: PAD-CWD1016**, preferably by e-mail to: kpitjobs@kp.org, or fax to: 1-800-839-5140. The tangible and intangible benefits of working for an organization of our size and scope will change your career perspective in a healthy way. Affirmative Action/Equal Opportunity Employer. All trademarks belong to their respective companies.

www.kp.org/jobs

What do you want the Internet to be?℠

The New Internet

"As colorful as my imagination." One day, technology will give people everywhere the power to pursue their dreams. No matter how unique or ambitious. That day has come at Nortel Networks. Right now, we're building the new high-performance Internet—and making communication and collaboration faster, more efficient, and more secure than ever before. It means new possibilities for our customers. And some incredible opportunities for visionaries like you.

We currently have **exciting opportunities** in cities across **North America**.

Exceptional compensation and excellent benefits are just part of what you can expect from this world-leading, $21 billion company. So come together, right now with Nortel Networks, and make the Internet whatever you want it to be.

nortelnetworks.com/careers

NORTEL NETWORKS™

Nortel Networks is an Equal Opportunity Employer. Nortel Networks, the Nortel Networks logo, and the Globemark are trademarks of Nortel Networks. "What do you want the Internet to be?" is a service mark of Nortel Networks. © 2000 Nortel Networks. All rights reserved.

Technical Product Marketing Manager

San Diego, CA

Hughes Network Systems (HNS) is a leading supplier of broadband satellite and wireless products, services and networks. We are the world leader in VSAT satellite networks installed worldwide and one of the largest manufacturers of DIRECTV® satellite television systems. Our San Diego facility has an excellent opportunity for an Account Manager to provide technical support to new and existing customers.

You'll work with customers to establish requirements, write proposals, and prepare/deliver presentations, network design and pricing. You'll also maintain and develop technical information, including product information for use in presentations and designing network solutions. The position requires BSEE or equivalent, as well as a background in telecommunications, wide area networking and customer interface. Ability to identify customers' business and technical requirements is a key requirement, in addition to the ability to travel and work in diverse environments. Excellent oral, written, interpersonal and technical writing skills are essential.

With a casual, friendly atmosphere and a mix of career, recreational and benefit options to keep your life in balance, HNS offers a highly attractive work environment in beautiful San Diego. For immediate consideration, send your resume to: **Hughes Network Systems, Human Resources/MS, 10450 Pacific Center Court, San Diego, CA 92121**. E-mail (ASCII text only, no attachments, please): **recruitersd@hns.com** Fax: **(858) 457-3863**. Visit us at **www.hns.com** HNS is an equal opportunity/affirmative action employer. We welcome and encourage diversity in the workplace.

HUGHES
NETWORK SYSTEMS
Out there technology for down here.

The Best of Both Worlds!

Pre-IPO with a highly competitive stock option plan.
Backed by a Global Fortune 500 Corporation.
We're Opuswave Networks, Inc.
Experience OVER THE EDGE technology.
Where WIRELESS, VOICE & IP converge!

Product verification engineers
Quality assurance engineer
Senior systems engineers
Software development manager
Software engineers
Strategic planning manager
Senior Product managers
OMC engineer • VoIP engineer
Customer support engineer
Embedded system software developer

OPUSWAVE NETWORKS

Opuswave Networks, Inc.
1365 Garden of the Gods Road
Colorado Springs, CO 80907
infojobs@opuswave.com

ERP PROGRAM MANAGER
REQ #686

Connecting People and products to destinations around the globe – that's what the Port of Seattle does every day.

We are looking for an exceptional leader to oversee the operation, maintenance, usage and enhancement of the Port's PeopleSoft Enterprise Resource Planning (ERP) software, which supports our lines of business goals and plans. Requires 7 years of business and technology project management experience in the area of accounting/financial software; knowledge of design, programming and full development life cycle; BA/BS in a related field and 3 years of personnel and budget management experience. Preferred qualifications include an MBA, experience with PeopleSoft Financials and prior experience leading organizations in effective use of an enterprise software system. See our web site at www.portseattle.org for further details.
Filing closes on Friday November 10, 2000, at 4:000 p.m. Please send resumes/applications to: P.O. Box 1209, Seattle WA, 98111 or fax to (206) 728-3004.

Port of Seattle

It's Fast.

It's Huge.

It Crosses Worlds & Dimensions.

IT CAREERS

Senior R&D Architect to research new software design and emerging technologies. Design the integration methodology. Scientifically verify software design options and optimize design. Review system and component level design, code and deployment. Design and develop client/server applications using Visual C++, Visual Basic, Java, COM, DCOM, HTML, XML, SQL database. Perform integration test and support system test and production software application testing. Participate in system requirements and design meetings. 40 hrs/wk, M-F, 8:00 am – 5:00 pm. $75,000/yr. Require M.S. or equiv. Degree in Computer Science, Engineering, Maths, Computer Information System or equiv. And 1 years experience in the job offered and 1 years experience as a Sr. Software Analyst, Technical Lead, Sr. Consultant or equivalent. Experience must comprise design and development of software using Visual C++, XML and relational and object oriented databases. Relocation possible. Must have proof of legal authority to work in the U.S. Job in Longmont, Colorado. Application by mail only. Mail resume to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe St, Denver, CO 80202-2117, and refer to order number CO 4680032.

IT careers.com

where the best get better

1-800-762-2977

BindView Corporation is an award winning market leader in the development of IT risk management solutions that manage the security and integrity of networks and applications. Currently, we have career opportunities available at our development sites in Fremont, CA; Southborough, MA; Houston, TX; and Arlington, VA.

Career Opportunities Available:

Visual C++ Software Engineers - (all locations) 2+ yrs. C++, OOA/OOD, network protocols a plus. BS in Computer Science or related area and / or MS in Computer Science depending on level.

Software Quality Assurance Engineers - (all locations) 2 yrs. as NT, Netware or LAN System Administrator, UNIX (MA, CA) as well as Scripting and/or Automated Testing. BS in Computer Science or related area and/or MS in Computer Science depending on level.

Lead for Deployment Engineer Group - (Houston, TX) 2+ yrs. as a Team Lead and with C++, exp. with InstallShield and install scripts. BS in Computer Science or related area and / or MS in Computer Science depending on level.

Development Team Leads - (Houston, TX) 2 yrs. as Team Lead, 3+ yrs. with C++, BS in Computer Science or related area and / or MS in Computer Science depending on level.

Program Managers - (Arlington, VA and Southborough, MA) 3+ yrs. in Software Development with Management exp. Exp. with Software Development Process, OOP, design and prototyping of product features. Network protocols a plus. BS in Computer Science or related area and / or MS in Computer Science depending on level.

Build Engineers - 1 5+ years with C++ and Version Control software (ClearCase, PVCS, Source Safe or MKS SI). BS in Computer Science or related area and/or MS in Computer Science depending on level.

Technical Writer / Information Developers - 5 yrs. exp with Software Documentation. Experienced with FrameMaker and RoboHelp. BA related area preferred.

For more career opportunity information, visit:
www.bindview.com

We offer a flexible, creative and energetic environment with an excellent benefits package; 3 weeks vacation, 401(k), ESPP, stock options, health care benefits and more. Submit resumes to: **acooksey@bindview.com (reference job code: INFO10100).**

BIND VIEW

Equal Opportunity Employer

Work all day on one of the nation's largest networks. Then go home or wherever.

Sure, we have one of the country's largest privately owned computer networks and the #15 ranking on the Fortune 500 list. And of course, our salaries are highly competitive. But what makes working here so special are our family-friendly benefits packages, easy-going lifestyle, diverse workplace and welcoming communities. No wonder we were included in *Computerworld's* "100 Best Places to Work."

Contact State Farm Human Resources at **jobopps.corpsouth@statefarm.com** for information about current positions. Or visit our website at **statefarm.com**™

STATE FARM INSURANCE

Get there with State Farm.

State Farm Insurance Companies • Home Offices: Bloomington, Illinois
An Equal Opportunity Employer

For High Tech Jobs go to **www.dice.com**

dice.com
High tech jobs online

NASDAQ: EWBX AN EARTHWEB SERVICE

Computer-Now hiring consultants, engineers, programmers, and systems analysts w/experience in object oriented programming, e-commerce, ERP (Oracle, SAP, Baan, & Peoplesoft), RDMS, UNIX, or network protocols. Apply to D. Haynes, Ariba, Inc., 1565 Charleston Rd, Moutain View, CA 94043.

PROGRAMMERS

Up to $145/Hr !!!!

Java/Web,Oracle/SQL,

C/C++/Unix, More !!!!!!

www.jobw.com or e-mail:

Resumes@jobw.com

Talent is the fuel of the new economy.

ITcareers and ITcareers.com can put your message in front of 2/3 of all US IT professionals. If you want to make hires, make your way into our pages.

Fill up with ITcareers.

Call Janis Crowley at
1-800-762-2977

MBNA IS A COMPANY OF PEOPLE COMMITTED TO BEING

leaders in innovation,

quality, efficiency, and Customer satisfaction.

At MBNA, we consistently improve service by finding ways to do things better through state-of-the-art technology. We've built the sophisticated infrastructure it takes to improve operational efficiency, enhance computer reliability, and accelerate telecommunications responsiveness. As a result, we're able to provide the exceptional service that MBNA Customers expect. We're also able to offer the stable work environment that helps balance the demands of the family and the workplace, and can rarely be found at a dot-com company. At MBNA, technology is a hallmark of our success. Make your mark by joining us today.

Available IT opportunities in our Texas and Delaware locations include the following:

- ***Business Technology Support*** (Newark, DE)
  Financial Consulting or Banking experience preferred.
  Project Managers
  Project Liaisons
- ***Distributed Systems*** (Dallas, TX and Newark, DE)
  Technical Architecture
  Project Managers
  Client Server Developers
  Internet Developers
  System Architects
  Middleware Developers
  Database Administrators
- ***Corporate Systems*** (Dallas, TX)
  Technical Project Managers
  Mainframe Programmers
  DB2 System Architects
  Mainframe Testers
- ***Desktop Computing*** (Dallas, TX and Newark, DE)
  LAN Administrators
  NT Engineers
- ***Distributed Operations*** (Newark, DE)
  Technical Project Managers
  System Administrators
  Computer Operators
- ***Telecommunications*** (Dallas, TX and Newark, DE)
  Network Engineers
  Network Designers
  Firewall Engineers
  Network Support Analyst
  Voice Engineers
- ***Information Processing Services*** (Dallas, TX)
  Systems Programmers
  Computer Operators
  Operations Support

Both *FORTUNE* and *Working Mother* magazines have recognized MBNA for our superior work environment. For immediate consideration, please send your resume to:
Corporate Staffing, Source Code: Q4HDI, MBNA Hallmark Information Services, 16001 North Dallas Parkway, Addison, Texas, 75001; Fax: 972-774-5836; E-mail: dallas@mbnacareers.com

We're proud to be an Equal Employment Opportunity/voluntary Affirmative Action Employer.

MBNA HALLMARK INFORMATION SERVICES

We are looking for people who like people.

© 2000 MBNA America Bank, N.A.

IT CAREERS

where the best get better

NetworkWorld AN IDG COMPANY

WORLD

COMPUTERWORLD

ex Your intern has a bigger salary than you.

In today's hot IT job market, "paying your dues" can mean working for less than six figures. And that's not only good for IT newcomers. It's great for you, too. Because right now, your IT experience has never been worth more. Want proof? Sign up for free Job Alerts from ITcareers.com. We have tens of thousands of serious IT opportunities at some of the world's best-paying and best-run companies. When one of our posted positions matches your profile, we'll alert you right away. ITcareers.com is a service of the ITworld.com network, the industry's most trusted resource for all the latest IT news, products, job listings and more. To start your search, visit www.ITcareers.com.

IT careers.com

PUT YOUR OWN STARS ON STAGE

Announcing The ITcareers Achievement Showcase

This is where advertising and retention work together.

Build retention into your IT advertising program through public recognition of your top performers. Use messages on how you value employees - as you attempt to attract new ones.

The ITcareers Showcase will have prime position within our week advertising section - appearing in Computerworld, InfoWorld and Network World.

These pages will honor:

- ★ Award winners for technology or service achievements
- ★ Award winners for community service
- ★ Patent awards
- ★ Special assignments and promotions

The Achievement Showcase was created for employers who understand that your most important target market is the IT professional who already works for you.

For information on our special introductory rates, call Janis Crowley 1-800-762-2977.

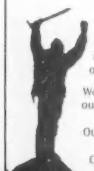
IT careers

Aventis Pharmaceuticals

Aventis

The Adventure of a Lifetime

Our challenge is life.



Aventis Pharmaceuticals is the U.S. pharmaceuticals subsidiary of a newly created world-class life sciences company, Aventis SA, which was created by the merger of Hoechst AG and Rhône-Poulenc SA. Aventis Pharmaceuticals is an innovative company committed to extending and enhancing the quality of life for patients throughout North America and the world. We are accomplishing this through the discovery, development, manufacture and sale of prescription products that fulfill unmet medical needs.

We have one of the world's largest research and development budgets, commercial strengths in all of the world's major markets, experienced international management, cutting-edge information technology and an outstanding workforce.

Our success and continued growth offers opportunities to Information Technology professionals seeking to join a leading, innovation-driven company.

Career opportunities exist in the following functional areas:

SAP/ERP Analysts

Systems Analysis and Development:

- Identify business requirements
- Perform analysis and systems design
- Research and evaluate alternative technology and business solutions
- Analyze and implement business process solutions

Functional/Business Analysis

- Work with business areas as primary liaison to determine functional requirements
- Recommend designs for user interfaces
- Support effective systems integration
- Analyze business processes Various positions for candidates with 2-5 years SAP/ERP experience. Must have knowledge of one or more of the following modules: Financials (FI-CO), Sales &Distribution (SD), Materials Management (MM), Human Resources (HR) and Production Planning (PP).

E-Business Systems Strategy (Research, Planning, Architecture and Development)

E-Project Management

- Actively participate in the strategic development and tactical deployment of E-Business solutions
- Design innovative and broadly constructed e-business processes
- Manage, develop and implement global Internet development projects
- Create new business models and enabling web-based technologies to impact global change

Research and Development

- Research e-business technologies and deployment strategies
- Assess tools and enabling technologies used to create innovative and collaborative business solutions
- Evaluate cutting-edge technologies (hardware and software) that will be used to execute innovative e-business strategies
- Recommend products, vendors and innovative solutions to the most challeng ing global e-business initiatives

Strong communications skills required, as well as a well-rounded understanding of "E- technologies" and deployment methods. The right combination of business savvy and technical expertise is required.

Join us for the adventure of a lifetime. Aventis Pharmaceuticals offers a dynamic and innovative work environment with outstanding benefits, competitive salaries and bonus programs.

For more information visit: www.aventis.com

(To explore career opportunities, choose Aventis Pharma US from the Explore Aventis menu and then click on the careers button)

Aventis Pharmaceuticals is proud to be an equal opportunity employer committed to a diverse workforce. © 2000 Aventis Pharmaceuticals, Inc.

PROGRAMMER ANALYST

To design, develop and test computer software for business and financial applications, applying principles and techniques of computer science, financial documentation and mathematical analysis, analyze software requirements for feasibility of design and hardware interface, design and direct software system testing procedures; and use expertise in Oracle financials, Oracle Inventory, General Ledger, Costing Modules using Oracle/NT/Reports and Oracle forms on Windows/UNIX Platform. Requirements: Bachelor's Degree in computer science or related field and three years of experience as a programmer analyst or computer programmer. Knowledge of Oracle financials, Oracle Inventory, General Ledger, Costing Modules using Oracle/NT/Reports and Oracle forms on Windows/UNIX Platform. Salary: $70,000/year. Working Conditions: 8 a.m. to 5 p.m., 40 hours/week. Apply: Ms. Sue Notarnicola, Supervisor, Fayette County Team PA CareerLink, 32 Iowa Street, Uniontown, PA 15401-3513. Refer to Job Order No. WEB 129797.

PROGRAMMER ANALYST with 2 years of industry experience to design and develop software applications. Excellent communications and a Bachelor's degree required. Fax resume to: Tina (781) 932-0895 or email: tina.betti@talentpoint.com; TalentPoint, Inc 18 Commerce Way 7th Fl, Woburn, MA 01801

Engineers/Consultants/ Programmer/Analysts needed. Several senior and entry level positions available for qualified candidates possessing MS/BS or equivalent and/or relevant work experience. Work with some of the following Oracle, PeopleSoft, SQL, C, UNIX, DOS, MS Windows, SAP R/3 and Actuate. Must be willing to travel and relocate as required.Fax resume to K2 Systems, HR Dept (Fax: 972-422-9100) or e-mail to vikram@k2systems.com

Full time Senior Programmer Analyst to develop, modify and maintain applications that are customized or standardized using PL/SQL, Oracle Developer 2000, Forms 4.5, Reports 2.5, Oracle 7 database. Must have a Bachelor's degree in CS, Electronics Engineering or foreign degree equivalent. Must have two years of experience in the job offered or two years of experience in a position with same duties. Salary: $60,000/yr. Send resume to: DataScan Technologies, 1105 Sanctuary Parkway, Suite 190, Alpharetta, GA 30004, Attn: Kimberly Donohue.

Database Analyst/Data Architect wanted by NJ based IS/IT Professional Consulting Services Firm for locs throughout US. Must have Masters or equiv. (Bach. + 5 yrs. exp.) in Comp. Sc. or Engg. & some s/ware exp.

Respond to: HR Dept., Instasofte Inc., 173 Essex Avenue, Metuchen, NJ 08840 (Ref: 00-6845IM).

Systems Analyst (multiple openings)-Must have a Bach or equiv in any engg or scientific field and 2 yrs prgmg exp.

Respond by resume to: HR Dept, Techlead Corp, 1420 Boston-Providence Highway, Ste 266, Norwood, MA 02062.

CW001016E-8

hp, one of the "Most Admired Companies in America" according to Fortune Magazine's latest ranking of U.S. - based companies, is a global leader in everything from computer systems and solutions, to test and measurement systems. We have opportunities available in Fort Collins, Greeley and Loveland, Colorado in the following positions:

- Communications Manager
- Hardware Design Engineer
- Software Design Engineer
- Product Marketing Engineer/Product Manager
- Member of IT Technical Staff
- Information Technology Specialist

hp offers competitive compensation and excellent benefits, including profit sharing, stock purchases, 401K and a retirement plan. We invite you to e-mail your resume indicating Ad #8324 to: resumes@hp.com (Subject Line: Ad #8324), or send/fax it to Hewlett-Packard Employment Response Center, Attn: Ad #8324, 3000 Hanover Street, MS20AZ, Palo Alto, CA 94304-1181. FAX: (650) 813-3860. Please be sure to include Ad #8324 on your resume.

hp is an equal opportunity employer dedicated to affirmative action and work force diversity.

hp
invent

Director, Partner's Technical Management sought by computer software development company in Englewood, CO, to work in Pacheco, CA & other unanticipated job sites in the U.S., to, for the Business Development Group of a company that develops & markets middleware, manage the technical relationships with strategic partners, including system integrators, VARs, & application companies responsible for integration of companys' products & methodologies into partners' working practices. This requires an extensive background in consulting & project management. Essential to have international experience due to global nature of partners. Responsible for partner certification on proprietary products & will assist Business Development & Sales in formulating technical architecture solutions. Work with partners in SAP PeopleSoft environment, assisting in integration of legacy systems using Oracle, SQL/Server & DB2 databases. Provide pre-& post-sales technical support for business partners. Requires 5 yrs experience providing internal & customer training related to middleware products, & project management & consulting experience. Working knowledge of PeopleSoft, SAP, Oracle, SQL/Server, & DB2. $115,000/yr; M-F, 8am-5pm. Respond by resume to James Shimada, CO Dept. of Labor & Employment, Tower II, #400, 1515 Arapahoe St., Denver, CO 80202, & refer to Job Order No. CO4680229.

ENGINEERING

The San Francisco office of Charles Schwab & Co., Inc. has Staff, Sr. Staff and Director career opportunities in the Schwab Information Technology Enterprise. Specific disciplines include Database Administration, Systems Programmers, Programmer Analysts, Information Security Specialists, System Administrators, Architects, Project Managers, Systems Engineers and Network Engineers. Technical Environments: NT, UNIX (Solaris, AIX, HP-UX), MVS, CICS, CICS/6000, SNA, C, C++, COBOL, Powerbuilder, SQL DB2, Oracle, PeopleSoft, Firewalls, Visual Basic, Java, JavaBeans, ActiveX, J++, CGI Scripting, HTML, SILK, QA Partner, CORBA, DCE, HP-Openview, NewBridge, Tivoli, Remedy, Legato, Periphonics, CTI, Parallel Sysplex, LDRPS, MQ, NetIQ, ATM, PBX, Electronic Output, Cisco, Sendmail, Imaging, Electronic Messaging, AFP. We offer the competitive salaries, excellent incentives and the comprehensive benefits of a recognized industry leader. Email your resume, indicating Job Code: SK/99IC to: schwab.jobs@schwab.com. Charles Schwab & Co. Inc. Member SIPC/NYSE. 0300-5070. Equal Opportunity Employer.

---

careers.com

Consultant (Soft. Developer). Job location: San Francisco, CA. Duties: Develop Client/Server & Web-based solutions using Microsoft ASP, VBScript, ActiveX Components, SQL Server, Java applets & HTML for business-to-consumer & business-to-business applications. Design, analyze, develop, test & implement full life-cycle application development. Design databases & develop stored procedures. Maintain DBMS platforms such as Oracle, Sybase & MS SQL server. Prepare project status reports. Utilize web & object-oriented technologies such as JAVA, COM/DCOM, ActiveX & Active Server Pages to develop applications for enterprise & consumer use. Design Intranet & Extranet infrastructures to serve client's e-commerce needs. Requires: M.S. in Acctg, Comp. Info, Systems/Comp. Sci/Info. Sci plus 2 yrs exp. in the job offered or 2 yrs exp. as a Soft./Web Developer. Send resume to Carmen Strickland, marchFIRST, Inc., 311 S. Wacker Dr., Suite 3500, Chicago, IL 60606.

Software Engineer (2 positions) – Researches, designs and develops computer software systems in conjunction with hardware product development applying principles and techniques of computer science, engineering and mathematical analysis using MS Visual C/C++ and Visual Basic programming tools. Requires B.S. in Computer Science, Computer Engineering, Math or Engineering discipline and six (6) years experience in the job offered or as a Systems Analyst, Software Engineer or Programmer Analyst, one year of which must be in MS Visual C/C++ and Visual Basic programming tools. 5 day, 40 hr/wk $ 70,000/yr. Respond with resume to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to Job Order # CO 4678890.

SOFTWARE ENGINEER

Design & develop compiler using object-oriented approach with Visual C++, Build lexical analyzer to scan programming scripts. Define productions for language syntactic description. Build recursive descent parser to analyze sentence syntax & generate stream of instructions. Evaluate/analyze generated code. Include omission/commission error detection in syntactical analyzer. Build error recovery mechanism. Write scripting language specs. Maintain/enhance stack based virtual machine for specification changes. Implement debugging tools to analyze run-time problems. Maintain simulation debugger Windows interface. Required: B.S. in Computer Science. 2 years exp in software engineering including 1 year exp. in C++ Windows programming. Must have built a compiler. $60,600/year 9:00-6:00. Send resumes to Dept. of Workforce Services, Pat Redington Job Order #3061104, 140 E 300 S, SLC UT 84111.

Software Engineer wanted by Automated Securities Trade Execution & Analysis Co in Culver City, CA. Must have BS or equiv in Comp Sci, Math or related field & 1 yr exp dvlpg software. Respond to: Elizabeth Boughton, ITG, Inc., 400 Corporate Pointe, Ste 855, Culver City, CA 90230.

SOFTWARE ENGINEER: Torrance, CA. Calsoft Systems, Inc. specializes in custom applications based on the Microsoft Back Office family of products. Calsoft Systems is currently looking for Software Engineers with experience in Windows NT, SQL Server and Visual C++. Qualified candidates should hold a Bachelor degree in Computer Science, Math or Engineering and have one year of related experience. Send resume to: Calsoft Systems, Inc., Attn: Nem Bajra, 20300 S. Vermont Ave, Ste 110, Torrance, CA 90502

SCS America (BrightStar) is searching for SAP analysts with the following requirements: SAP experience in FI, CO, AM, PS, HR, SD, MM, WM, PP, QM, SM, Basis or Abap/4. Also looking for Business Analysts and J.D. Edwards Functional Consultants. Positions available throughout the U.S. Extensive travel and possible relocation involved. Send resumes to: BrightStar IT Group, 950 Tower Lane, Suite #1750, Foster City, CA 94404 or e-mail to: resumes@brightstar.com

---

Network Engineer

Job involves planning, implementation & optimization of large-scale networks, design IP/IPX multicast addressing over Frame Relay & ATM networks, managing VOIP network projects & oversee user training & product presentations. CCNA & database design preferred. Req: MS w/5 yrs. Exp. strong communication skills & ability to work indep. Sal: $74K, 40 hrs/wk Job/int: San Ramon. Send resume: HR Dept., P.O Box 1426, San Ramon CA 94583 or email: jobs_perm@peakxv.net. Must Refer to Job #: 1003. No phone calls please.

Engineers/Programmers/Analyst/Consultants needed. Several senior and entry level positions available for qualified candidates possessing MS/BS or equivalent and/or relevant work experience. Work with some of the following, Oracle, PL/SQL, C,C++, Unix, Windows, Windows NT, Forms and Reports, VAX/VMS, VAX-C, Visual Basics, SQL Server, Cobol, HTML, or Java. Fax resume to Ace Technologies Attn: Recruiter (408)586-8348.

Software Research Engineer to develop MFC application to simulate multiple callers in telecom systems using dialog boards for speech recognition and text-to-speech. Utilizes skills below. Requires Bachelors Degree in computer science, computer engineering, electrical engineering or equivalent and knowledge/ability in: C++ and MFC, coding & debugging; client server; JAVA/CORBA programming; telephony programming; enhanced GUI. Salary $45,000 per year. Send resume to Ms. Pat Redington, Job Order No. 3061096, DEPARTMENT OF WORKFORCE SERVICES, 140 East 300 South, Fifth Floor, Salt Lake City, Utah 84111.

Computer Systems Engineer (2 positions) – Analyze data processing requirements to plan data processing that will provide system capabilities required for projected work loads and plan layout and installation of modifications to existing information systems using Novell UnixWare, C/C++ and JAVA. Requires B.S. in Computer Science or Engineer, Electronic or Electrical Engineering or Mathematics and three (3) years experience in the job offered or as a Network Engineer or System Engineer, one of which must be in Novell UnixWare, C/C++ and JAVA. 5 day, 40 hr/wk, $65,000/yr. Please respond with resume to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to Job Order # CO 4678892.

Software Engineer II to create internet component to browse any page and convert text and links into a format using text and speech engine. Design complicated system elements and test and debug, using skills noted below. Requires Bachelors Degree in computer science, electrical engineering, computer engineering or equivalent. Must have knowledge ability and proficiency in C++ coding, large-scale client/server JAVA programming, parallel and multi-computer system programming. Salary $60,000 per year. Send resume to Ms. Pat Redington, Job Order No.: 3061095, DEPARTMENT OF WORKFORCE SERVICES, 140 East 300 South, Fifth Floor, Salt Lake City, Utah 84111.

Software Engineer I to create a server and client application, design and develop interfaces, in order to allow server access from client sites. Position utilizes skills indicated. Requires Bachelors Degree in computer science, computer engineering, electrical engineering or equivalent and proficiency and ability in C++ coding, Microsoft Foundation Class (MFC), COM object programming, solid understanding in object oriented data structure modeling, distributed system modeling and parallel/multithread programming in multicomputer environments. Salary $45,000 per year. Send resume to Ms. Pat Redington, Job Order No: 3061094, DEPARTMENT OF WORKFORCE SERVICES, 140 East 300 South, Fifth Floor, Salt Lake City, Utah 84111.

Software Engineer/Infrastructure Developer to create 4th generation language infrastructure for telephony processes and executes, utilizing distribution computing environment, database design and synchronization. Utilizes skills noted below. Requires Bachelors Degree in computer science, computer engineering, electrical engineering or equivalent. Must have knowledge and proficiency in C/C++, SQL/DBMS design in Access and Oracle, MS Visual C++ and Microsoft Foundation Class (MFC). Object oriented methodologies and Windows NT operating system. Salary $55,000 per year. Send resume to Ms. Pat Redington, Job Order No: 3061093, DEPARTMENT OF WORKFORCE SERVICES, 140 East 300 South, Fifth Floor, Salt Lake City, Utah 84111.

PROGRAMMER wanted by Massachusetts based Info Services & S/ware Dvlpt Co for job loc in San Mateo, CA. Must have Bach in Electronics, Engg or Comp Sci & 5 yrs exp analyzing, dsgng & implementing of info systems. Respond to: HR Dept, SunGard Shareholder Systems, Inc., 199 Wells Avenue, Newton, MA 02159.

INFORMATION SYSTEMS MANAGERS

Robert Half Int'l, Inc., the global leader in specialized staffing is looking for information technology managers at its Pleasanton, California location. Information Systems Managers will oversee and manage applications developers in the development or support of various business applications or data processing systems. Requires a Bachelor's degree or equivalent and 2 yrs related experience in a lead technical or managerial position.

Please send resumes to: Robert Half Int'l, Inc., Corporate Recruiting, 5720 Stoneridge Drive, Suite 3, Pleasanton, CA 94588-2700 FAX (925) 598-8950. e-mail: corp.resumes@rhi.com

---

Project Leader: Colorado Springs, CO. 40 hrs/wk from 9:00AM to 6:00PM. Salary $61,500/yr. Understand client requirements to dvlp, maintain and support Business Applic systems using C/C++, X-Windows, TCP/IP, SNMP, SNMPV2, DNS, DEC-OMNI, Object Oriented Analysis & Design (Rational Rose, RoughWave) in VAX/VMS, SUN UNIX, HP UNIX environment. Supervise team members. Master's degree in Comp, Engg or related reqd. 2 yr exp in offd position. Must have proof of legal auth to work in the U.S. Send resume to: CO Dept of Labor & Employment, Employment Programs, ATTN: Jim Shimada, 2 Park Central, Ste 400, 1515 Arapahoe Street, Denver, CO 80202-2117. JO# 4679814.

Computer Systems Engineer (2 pos)-Analyze data processing reqmts to plan systm infrastructure that will provide systm capabilities req'd for projected work loads & plan layout & do installation & modification of Cisco based LAN & WAN & do planning & implmtn of network & infrastructure based on MS Win NT & MS Exchange server. Req BS in Comp Sci or Engg, Electronic or Electrical Engg or Math & 2 yrs exp in job offd or as Network Engr, Systms Analyst or Prgmr Analyst, 1 yr of which must be in MS Win NT based networks & administration & MS Exchange server. 5 day, 40 hr/wk $72K/yr. Respond w/resume to Colorado Dept of Labor & Employment, Employment Prgms, Attn: Jim Shimada, 2 Park Central, Ste 400, 1515 Arapahoe St, Denver, CO 80202-2117 & refer to JO# CO4679058.

Programmer Analyst (2 positions) - Plan, develop, test and document computer programs applying knowledge of programming techniques and computer systems utilizing C and C++ on an OS2 and Windows NT operating system. Will perform routine tasks and will work under close supervision while assisting staff. Work is closely monitored and reviewed for accuracy. Requires B.S. in Computer Science, Electronic or Electrical Engineering or Mathematics. 5 day, 40 hr/wk $41,000/yr. Please respond with resume to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to Job Order # CO4678895.

SR. APPLICATIONS SPECIALIST sought by computer consulting co in Sugar Land, TX. Must have Master's in Computer Science or its equivalent as determined by a recognized credential evaluator, plus 4 yrs commercial software development experience. Respond to: H.R. Dept., BNI/CR, Digital Consulting & Software Services, Inc., One Sugar Creek Center Blvd., Ste. #500, Sugar Land, TX 77478.

"Shear" IT Opportunity

Join a company that's been a success for 350 years, and the advantages are clear-cut. Internationally known for superior products and cutting-edge designs, Fiskars Consumer Products, Inc. continues to set new industry standards and receive awards for excellence. Shape the excitement to come with us and put more opportunity, benefits and advantages into your future. Currently, we are seeking this individual to join us in **Madison, WI:**

J.D. Edwards Applications Analyst

You will be responsible for daily administration and support of JDE OneWorld; assist in developing work plans, configuring the software to match business requirements, managing system requests and working with users to resolve both technical and applications problems; investigate/define requirements; and develop system specifications and hands-on programming using JDE OneWorld Tool Sets of reports. A Bachelor's degree in Business or Computer Science, 1 + years' full life cycle implementation of JDE OneWorld, 5+ years' IT experience, a background in a Client Server environment and experience with supporting system interfaces and reports are required.

J.D. Edwards OneWorld Developer

Work with users to design, modify and write extensions to the financial, distribution and sales order entry modules of JDE OneWorld. Three years' IT experience, OO Toolsets and Design Constructs, JDE systems experience, business application development background, a BS in CS or IS, 2 years' experience supporting manufacturing/business systems, experience in C++, SQL and AS400 and 1 + years' development experience in JDE OneWorld in an NT and AS400 environment required.

We offer a competitive salary, exceptional benefits and future growth. Qualified candidates please forward resume, cover letter and salary history, indicating the position of interest, to: **Fiskars Inc., Attn: BK, 636 Science Drive, Madison, WI 53711. Fax: 608-233-5321. E-mail: employment@fiskars.com.** Principals Only. No phone calls please. EOE

www.fiskars.com

FISKARS®

Programmer Analyst (multiple openings) to design, analyze & code programs to meet client needs using visual Basic, MS-Access & Oracle; analyze data processing & s/ware requirements of application system using Oracle tools, system study, analysis, d/base design, development & implementation using Novel Netware, SQL*Plus, Pro*C, PL/SQL & SQL*ReportWriter; design user interface screens & menus using ITC screen generators; code & implement data processing programs using Visual Basic; develop testing applications, procedures & documentation. Reqs. Bachelor's in Comp. Sci., Comp. Applications, Comp. Engg., Comp. Info. Systems, Electrical or Electronic Engg. or Math or its foreign educ equiv plus 1 yr exp in the job offered or 1 yr related exp as Programmer Analyst or Programmer. Related exp must include system study, analysis, d/base design, development, testing & implementation & using Visual Basic, MS Access & Novel Netware. $38,000/yr, 40 hrs/wk, OT as req'd, 8a-5p. Applicants must show proof of legal authority to work in U.S. Send 2 resumes (no calls) to Illinois Dept. Of Employment Security, 401 S. State St. - 7 North, Chicago, IL 60605, Attn: Brenda Kelly, Ref. #V-IL 23948-K Employer Paid Ad.

Two Programmer Analysts needed for West Central Illinois location with B.S. in one of the following: Computer Science or Engineering. $55K per year, 8:00 a.m. - 5:00 p.m., 40 hrs/wk. Consult with client companies to determine user requirements. Develop specifications, analyze, design, develop, test, implement and document computer applications. Evaluate user requests for new & modified programs; determine feasibility, time and cost, formulate plans outlining steps required for program development using structured analysis and design. Convert specifications into detailed instructions for coding. Experience working with VS COBOL II, COBOL II, VSAM, DB2, JCL, CICS, and IMS/DB/DC. Applicants must show proof of legal authority to work in the U.S. Send resume to Illinois Dept. of Employment Security, 401 S State Street - 7 North, Chicago, IL 60605. Attention: Leonard Boska. Reference #V-IL 24089 - B & V-IL 24081 - B. An Employer Paid Ad. No calls - Send 2 copies of both resume & cover letter.

YOUR INNOVATION CAN REALLY TAKE YOU PLACES.

The people at Tellabs are a bold team - always pushing the envelope and staying a step ahead. You see, the future didn't just arrive for Tellabs - we built it - with visionary innovations, industry leadership and plain hard work. It's that kind of dedication that's driven us to be a world leader in optical networking, next-generation switching, broadband access and service solutions. We enjoy an unrivaled tradition of high-priority research, world-class manufacturing and mind-boggling growth in an industry that never stops changing. We're one of only six companies to be listed on two of *FORTUNE* magazine's most popular rankings: **100 Best Places to Work For** and **100 Fastest-Growing Companies.** Now, we're searching for high achievers and flexible thinkers to join our dynamic team. Come to our Job Fair, and immerse yourself in an environment of success.

TELLABS JOB FAIR

Saturday, October 21 from 9am to 12pm
Holiday Inn Select - Naperville, IL
(off I-88 at Naperville and Diehl Roads)

We are currently seeking talented professionals in all business areas:
Software and Hardware Engineering • Manufacturing
E-Commerce • Information Technology • Technical Support

Positions are also available for Software Engineers at our new location in Schaumburg.

New College Graduates are Welcome. On-site interviews will be conducted with hiring managers. Please bring more than one copy of your resume.

Tellabs offers the competitive salaries and comprehensive benefits you would expect of a world leader. If unable to attend our Job Fair, forward your resume with salary history and position of interest to: **Tellabs, 1000 Remington Blvd., Bolingbrook, IL 60440. Fax: 630-378-4493. E-mail: jobs@tellabs.com** Please indicate source code JFBBK00.

tellabs CLEAR IDEAS
www.tellabs.com
100 BEST COMPANIES TO WORK FOR FORTUNE 2000

© 2000 Tellabs EOE M/F/D/V

DID YOU KNOW...
Chicago magazine just ranked Tellabs #4 of the Top 25 Places to Work in Chicago.

Open your mind to a career with unlimited possibilities.

At Kanbay, we're growing faster than ever – globally. We're an IT consulting firm accelerating legacy-to-web technology worldwide. In our environment, we value flexibility, creativity and initiative. And that's just the beginning. Are you up to the challenge? Then open wide. **The following opportunities are based at our corporate headquarters in Chicago and locations nationwide:**

- **Consultant**
- **Lead Web Architect**
- **Programmer/Analyst - C/C++, Unix**
- **Senior Consultant**
- **Senior Project Manager, E- Commerce**
- **Web Developer**
- **Team Lead**

We offer an excellent benefits package, including company paid full coverage for health, dental, and vision, relocation reimbursement, company contributed 401K and tuition reimbursement. For consideration, forward response to our resume processing center at: **Kanbay, Inc., P.O. Box 3058, Scranton, PA 18505-0058. Fax: 1-888-325-2020. E-mail: kanbay@alexus.com. Please reference code CWDCH0100 in all correspondence.** EOE

Kanbay
www.kanbay.com

Sr. OO/Web Technical Architect

An essential role in transitioning business vision and requirements into a comprehensive, scalable, flexible, future-proof, distributed object solutions. You will lead elite technical teams in designing, implementing and transitioning such systems in a business driven environment

- Extensive professional experience in developing large and complex distributed systems in a business arena, with several years in advanced technical and application architecture roles
- 2-3 years architecting complex, web-based solutions, preferably business to business solutions incorporating legacy and ERP applications
- Proven experience with OO/web development concepts, methodologies, modeling languages, artifacts and tools such as RUP, OMT, OOAD, UML, OOSE
- Proven experience with OO/Web based tools and development environments such as Java, C++, HTML, Rational Rose, Paradigm Plus, CORBA, COM, EJB, Servlets/JSP, Enterprise grade application servers
- An ability to combine these technologies to support business driven architecture
- Excellent communications, consulting and interpersonal skills – Must be able to communicate with executive level
- Ability to lead, grow and mentor technical teams
- Team player with strong leadership skills

Please fax your resume to J.P. at 312-856-1314.

Senior Programmer Analyst needed for West Central Illinois location with B.S. in one of the following: Computer Science or Electronics + 2 yrs. Experience as a Systems Analyst. $65K per year, 8:00 a.m. - 5:00 p.m., 40 hrs/wk. Perform complex and critical systems analysis tasks on systems, applications and products in data processing systems. Consult with client companies to determine user requirements. Develop specifications, analyze, design, test, implement and document computer applications. Convert specifications into detailed instructions for coding. Evaluate user requests for new and modified programs; formulate plans outlining steps required for program development, using structured analysis & design. The tools used include COBOL, DB2, CICS and IMS DB&DC. Applicants must show proof of legal authority to work in the U.S. Send resume to Illinois Dept. of Employment Security, 401 S State Street - 7 North, Chicago, IL 60605. Attention: Leonard Boska, Reference #V-IL 23245. An Employer Paid Ad. No calls - Send 2 copies of both resume & cover letter.

National Instruments Corp is a fast growing Hi-tech Co based in Austin, TX and is currently seeking to fill multiple positions in the following:

Software Engineers
Research, dsgn & dvlp s/ware in mainly C/C++ using OO dsgn & s/ware dsgn principles. Must have Bachelors in Engg., or Comp Sci or Physics or Math CODE: ZSW

Applications Engineers
Develop applications for products, systems and new business opportunities. Provide technical support for software products and their applications to customers, sales engineers, and distributors. Resolve technical issues using an understanding of electronics and software programming fundamentals. Must have Bachelor's in Engineering or Computer Science, or Physics or Math CODE: ZAE

Computer Hardware Design Engineers
Research, dvlp & manage projects in data acquisition, signal conditioning, industrial communication, instrument ctrl, image acquisition, embedded controllers & ASIC prdcts using dsgn techniques in analog & digital circuit dsgn, comp architecture, communication bus interfacing & digital signal processing. Must have Bachelors in Engg, Comp Sci, or Physics or Math CODE: ZHE

Programmer/Analysts (Business Processes)
Plan, analyze, dsgn, dvlp & test s/ware using Oracle, Lotus Notes, Web; use GUI & object-oriented dsgn to dvlp user interfaces & data entry screens that support business functions. Bach in Info Sys or Comp Sci or Business Admin. CODE: ZPA

Staff Programmer/Analysts
Evaluating applications development projects, leading a team of Programmer analysts/interns; planning, analyzing, dsgng, dvlpng & testing s/ware using Oracle & Lotus Notes; using GUI & object-oriented dsgn to dvlp user interfaces & data entry screens. Bach. needed and 2 years as Programmer/Analyst. CODE: SPA

Fax resumes to: Rebecca Snook, National Instruments Corp at 512-683-6924. Job Code must appear on resume.

Engineers/Consultants/Programmers/Analyst needed. Several positions available for qualified candidates possessing MS/BS or equivalent and/or relevant work experience. Work with some of the following Quality Assurance, PowerHouse 4GL, Unix, SQL, HP-9000, C, COBOL, JAVA and Oracle is necessary. Must be willing to travel and relocate as required. Fax resume to VersaComp Systems HR Dept 248-360-7028.

Programmer Analyst (multiple openings) to research & analyze data processing requirements of application systems; design user interface screens & menus using Visual Basic; code & implement data processing programs using COBOL & Visual Basic; system study, analysis, d/base design, development using Oracle & Crystal Reports; implement s/ware system & develop testing procedures; Reqs. Bachelor's in Comp. Sci., Comp. Engg., Electrical or Electronic Engg., Comp. Info., Systems, Comp. Mgmt., Comp. Applications or Math or its foreign educ equiv plus 1 yr exp in the job offered or 1 yr related exp as S/ware Engr. or Programmer. Related exp must include 4 mos of system study, analysis, d/base design, development, testing & implementation & using Oracle, Visual Basic & Crystal Reports; $43,000/yr, 40 hrs/wk, OT as req'd, 8a-5p. Applicants must show proof of legal authority to work in U.S. Send 2 resumes (no calls) to Illinois Dept. Of Employment Security, 401 S. State St. - 7 North, Chicago, IL 60605, Attn: Brenda Kelly, Ref. #V-IL 23949-K Employer Paid Ad.

Systems Analyst/Team Leader: consult with clients in the manufacturing & healthcare industries to define need or problem, & analyze data to determine or recommend business solution; design, develop & implement integrated software applications using Microsoft Access, Visual Basics, MapInfo & CPLEX/LINDO (mathematical modeling software); design complex relational/multi-dimensional databases, data warehousing, remote access systems, and graphical information systems; program in C, C++ & Pascal.

Master's degree in Computer Science required. Six months experience in the position or 6 months as a Programmer Analyst required.

40 hrs./wk.; 9:00 a.m. – 6:00 p.m.; $64,000/year. Must have proof of legal authority to work permanently in the U.S.

Send resumes to Illinois Department of Employment Security, 401 South State Street - 7 North, Chicago, Illinois, 60605. Attention: Arlene Thrower. Reference Number V-IL-23981-T. NO CALLS – SEND 2 COPIES OF BOTH RESUME AND COVER LETTER. AN EMPLOYER PAID AD.

Engineer Programmer
TPG Software, developer of investment accounting software, seeks Engineer Programmer to utilize Microsoft SQL 7.0, VB 6.0, and C++ to develop accounting software for fixed-income/derivative securities. Consult with clients regarding required features/functions; test/validate results for accuracy. Resolve production problems and instruct personnel in the technical use of the software. Candidate will have a MS in Computer Engineering and 5 years experience developing software using complex mathematical formulas and algorithms. Fax resume to 713-974-5499 or email to resume@thegenius.com.

Programmer Analyst needed for West Central Illinois location with B.S. in one of the following: Computer Science or Electronics. $58K per year, 8:00 a.m. - 5:00 p.m., 40 hrs/wk. Consult with client companies to determine user requirements. Develop specifications, analyze, design, test, implement and document computer applications. Evaluate user requests for new & modified programs; determine feasibility, time and cost; formulate plans outlining steps required for program development using structured analysis and design. Convert specifications into detailed instructions for coding. Experience working with IBM ES-9000, VS COBOL II, JCL, CICS, and DB2. Applicants must show proof of legal authority to work in the U.S. Send resume to Illinois Dept. of Employment Security, 401 S State Street - 7 North, Chicago, IL 60605. Attention: Leonard Boska, Reference #V-IL 24200. An Employer Paid Ad. No calls - Send 2 copies of both resume & cover letter.

Network Administrator. Wanted by a law firm in Chicago to coordinate the design, implementation & support of network systems. Must have Bachelor in Computer Sc. or Electronic Eng'g. & 1 yr exp. planning & deploying networks in LAN & WAN network systems. Send resume to: Y. Judd Azulay. Azulay, Horn, Villasuso & Yoo, 1 E. Wacker Dr.#2700, Chicago, IL 60601. No calls.

Software Engineer wanted by Fire Sprinkler Company in Downers Grove, IL. Must have Master's in Comp Sci. Respond to: Global Fire Protection Company. 5121 Thathcher Road, Downers Grove, IL 60515.

SAP Senior Basis Consultant Experienced in all phases of system development life cycles, including ASAP methodology. Must reside in Chicago area to provide 7x24 support to client. In-depth technical knowledge of UNIX/Oracle platforms. SAP R/3 versions 3.0F, 4.0B and 4.6B; SAP R/3 Banking version 4.01C; SAP BW version 1.2B and SAP communications using ALE. Respond by resume to: Jocelyn Fremark Symmetry Corporation Fax: 414-274-3111 E-mail: joc@sym-corp.com

---

UNIX Systems Engineer wanted by Arizona based Provider of Computing Solutions for job loc in Wood Dale, IL. Must have Bach or equiv in Comp Sci/Engg & 5 yrs s/ware exp. Respond to: HR Dept, Osage Systems Group, Inc., 1661 East Camelback, Ste 245, Phoenix, AZ 85016.

Systems Analyst wanted F/T by Systems Consulting Co. in Arlington Hts, IL. Bach degree required & 2 yrs exp in Siebel Tools, Visual Bsc 5 & 6, Visual InterDev 6, SourceSafe & Transact-SQL. Provide network support using Win NT4, d/base admin using SQL Server 6.5 & 7. Respond by resume to: HR Dept, STA Consulting, Inc., 855 E. Golf Rd, Ste 2138, Arlington Hts, IL 60005.

You can find a *better* JOB with *one* hand tied behind your back.

Just point your mouse to the world's best IT careers site.

Brought to you by Computerworld, InfoWorld and Network World.

Find out more. Call your ITcareers Sales Representative or Janis Crowley, 1-800-762-2977

IT careers.com

Where the best get better

Trusted by more hiring managers than any IT space in the world. IT careers

SURE NETWORKWORLD, COMPUTERWORLD, AND INFOWORLD HELP YOU DO A BETTER JOB. NOW LET US HELP YOU GET ONE. CALL: 1-800-762-2977

itcareers.com

We seek Level I & II Computer Programmers/Software Engineers w/ strong communication skills & any of following skills: VB, SQL & any database, AS/400, RPG/400, COBOL/400, CL, Visual C++ or C++, NT Admin., JAVA/HTML/CGI, COBRA, PERL, Oracle/Sybase/Informix/ SQL Developers & DBAs, Lotus notes, Domino & ERP packages. Level I: B.S. degree & 1-3 years exp. Level II: M.S. or B.S. & 5 yrs. exp. Assignments may be anywhere in the U.S. Send resume to Manager at Milestone Consulting Group, 8625 NW. 8 Street, Suite 422, Miami, FL 33126.

Saber Consulting, software consultants, seeks Sr & Assoc Consultants for various US locations. Bachelor + prof. exp. incl. Oracle. Resume to K.Khanna, 698 12th St. Suite 146, Salem, OR 97301.

SAPIENS AMERICAS provides large-scale/cross platform information technology system solutions for businesses. We seek Software Consultants/ Developers at our headquarters in Durham, NC and at client sites throughout the U.S. to assess client business and technical requirements and propose product and service solutions. Perform system analysis, design and engineering. Apply by sending resume to Jeff Oehler, Sapiens Americas, P.O. Box 13962, RTP, NC 27709-3962.

NEED TO HIRE. START WITH US.

ITcareers and ITcareers.com reach more than 2/3 of all US IT workers every week. If you need to hire top talent, start by hiring us.

Call your ITcareers Sales Representative or Janis Crowley at 1-800-762-2977.

ITCAREERS where the best get better ITcareers.com

SPL WORLDGROUP SPL WorldGroup is an International builder of business solutions. We are currently looking for individuals with Natural/DB2, Natural/Oracle, Natural/Construct, Natural/Adabas, Visual Basic, Smalltalk, C++, Java, Cobol, OO skills to work in our development centers in California, New Jersey and Chicago as:

Programmer/Analysts
Software Engineers
Systems Analysts
Project Leaders
Designers • Architects

Email, fax or mail your resume to:

SPL WorldGroup
75 Hawthorne Plaza Suite 2000
San Francisco, CA 94105
Attn: Jos Barnett
Fax 415-541-0224 EOE
E-mail:Jos_Barnett@splwg.com

www.splwg.com

Senior Programmer Analyst. Analyze, develop, code & maintain software for management information systems. Tools: C, UNIX; Oracle; Visual Basic; Novell. BS in Comp. Sci., Math, Physics or Electrical Eng. + 2 yrs exp in job offered or as Graduate Trainee or Software Engineer req'd. Previous 2 yrs exp must include 6 mos. with Oracle & UNIX. 40 hrs/wk, 9am-5pm, $67,000/yr. Must have proof of legal authority to work in the U.S. Send 2 copies of resume & cover letter to Illinois Dept. of Employment Security, 401 S. State St.-7 North, Chicago, IL 60605. Attn: Shella Lindsey. Ref# V-IL 23551-L. Employer Paid Ad. No calls.

Software Engineer. 40 hr/wk from 9am-5pm. $45,000/yr. Design and development of Computer Software using DB2, CICS and COBOL II on IBM Mainframe computers. Require Bachelor's Degree in Computer Science and 1 year experience in job offered. Applicants must show proof of legal authority to work permanently in the U.S. Please send resumes to Illinois Department of Employment Security, 401 South State Street-7 North, Chicago, Illinois 60605. Reference # V-IL 24080-B. An Employer Paid Ad. No Calls. Send 2 copies of both resume and cover letter.

IT professionals with a min. of 2 yrs industry experience in VC++, Java, SQL Server, SQA Manager, Rational Rose, Rambaughs OMT & WinNT-Unix connectivity needed. Travel reqd. Please send resume & salary reqmnts. to HR, Paramount Software Technology, Inc., 7187 Jonesboro Road, Suite C, Morrow, GA 30260.

ITT Cannon, an electro-mechanical components manufacturer, has immediate openings in Santa Ana, CA location for:
- Programmers
- SAP Analysts
- Program Manager
- IT Director

Positions require Bachelor's or Master's (degree and experience requirements vary with position and level). We offer competitive salary and benefit package, commensurate with position level and qualifications. Mail or fax your resume/letter of qualifications to ITT Cannon, ATTN: Human Resources, P.O. Box 929, Santa Ana, CA 92705. Fax. 714/628-2050. Please reference Ad# 4250. EOE.

Call your ITcareers Sales Representative or Janis Crowley 1-800-762-2977

Oracle Applications Consultant. Job Location: Atlanta, GA. Duties: Analyze, design, develop & implement Oracle based solutions using Oracle applications. Developer 2000 & Designer 2000. Create custom code using Oracle PL/SQL to convert data from legacy system to Oracle application database and interface between Oracle applications database & third party software. Create custom reports using Oracle Reports and develop forms using Oracle Forms. Requires M.S. (or foreign equiv.) in comp. or Info Sci., Eng. or related field and 1 yr. Exp. in job offered or 1 yrs. exp. as Consultant or Software Eng. Exp., which may have been obtained concurrently must include 1 yr. Exp. designing, developing & implementing Oracle based solutions using Oracle applications; 1yr. exp. using Developer 2000 and PL/SQL. EOE. 40 Hr./Wk., 8:00 a.m. to 5:00 p.m. Salary $80,000/yr. Send resume (no calls) to Diane Tuccito, AnswerThink Consulting Group, 817 W. Peachtree St., Suite 800, Atlanta, GA 30308. Must have legal auth. to work in U.S.

SOFTWARE ENGINEER to design, test, implement and develop application software in a client/server environment using Oracle, Oracle Forms, Oracle Reports, Oracle Financial Applications, Oracle Process Manufacturing Applications, SQL*Plus and PL/SQL. Train users and provide support. Require: Master's degree (or equivalent) in Computer Science/Engineering, Business Administration, Accounting, or a closely related field, with 2 years of experience in the job offered or as a Systems Analyst; A Bachelor degree with an additional five years of progressively responsible experience in the field will be considered equivalent to a Master degree and two years of experience. Salary: $63,500 per year, 8:00 am to 5:00 pm, M-F. Apply by resume to: James R. Crum, Chief Operations Officer, Better Organization Service Solutions, Inc., 6455 E. Johns Crossing, Suite 404, Duluth, GA 30097. Attn: Job SA

Applications Developers: Positions available in our New York, Chicago, San Jose, San Francisco and Nashville area offices. Will work with exceptional teams of computer and business professionals participating in full life-cycle development of distributed, object-oriented applications. Will design, develop and implement enterprise wide, distributed applications in various OO, client/server, n-tier environments against various relational databases. Will utilize OO languages, including Forte and Java and relational databases such as Informix, Oracle, Sybase, MS SQL Server, and DB2. Requirements: Bachelor's degree in Computer Science, Computer Engineering or Electrical Engineering or related field, or foreign equivalent. If interested, please email your resume and cover letter to jobs@thoughtworks.com.

"Positions open for System Administrators/Network Engineer to Design, Develop & Maintain high performance, high reliability technology networks using windowsNT, MS Exchange5.5. Hands on experience in trouble shooting and maintain the large WAN environment using TCP/IP, WINS, DNS, & MSSMS2.0. Knowledge of Cisco router & switches, Ip configuration is preferred. Requirement: 3 years on job & Degree in Engineering specially such as Computer Science or computer engineering or other engineering endeavor. Microsoft certified system Engineer+ Internet a plus.Please e-mail your resume mentioning in subject line or top of envelop REF CODE: SANE009 to Eileen_Adair@arcnow.com or Mail to Eileen Adair 301 Linden Wood Drive, Suite 215, Malvern PA 19355"

SENIOR SOFTWARE ENGINEER to design, develop, implement, test, maintain and support application software in a client/server environment using object oriented methodologies, Informix, IPC, Booch, OMT, UML, C, C++, awk, sed, SQL, Perl, CORBA, TCP/IP, Rogue Wave, Korn Shell, CMVC, Rational Rose, Paradigm Plus, Workshop, dbx, xdb, quantify, purify, and Great Circle under HP-UX, SUN Solaris and Windows 95/98/NT. Require: M.S. degree (or equivalent) in Computer Science, an Engineering discipline, or a closely related field, with three years of experience in the job offered. A B.S. degree with five years of progressively responsible experience will be accepted in lieu of the M.S. degree and three years of experience. Extensive travel on assignment to various sites within the U.S. is required. Salary: $75,000 per year, 8:00 am to 5:00 pm, M-F. Apply by resume to: Roz L. Alford, Principal, ASAP Staffing LLC, 3885 Holcomb Bridge Rd., Norcross, GA 30092. Attn: Job ST.

Emerald Solutions, Inc is seeking IT professionals to join our dynamic NATIONAL consulting firm.

Software Engineers:
Must have a Bachelor's Degree in Computer Science or related field and a minimum of 5 years related progressive work experience.

Programmer Analysts:
Must have a Bachelor's Degree in Computer Science or related field or the equivalent education and experience.

We have offices in Birmingham, AL, Phoenix, AZ, San Jose, CA, Walnut Creek, CA, Denver, CO, Stamford, CT, Alpharetta, GA, Boston, MA, Warren, NJ, New York, NY, Portland, OR, Dallas, TX, Vienna, VA, and Bellevue, WA.

Send resume, including location preference to:

Emerald Solutions, Inc.
Ref#CWAD10
111 SW 5th Ave., #2700
Portland, OR 97204
E-mail:
cwad10emeraldsolutions.com
EOE

Software Engineer to research and design solutions based upon emerging web and Internet technologies built on UNIX and UNIX networking with standard communication protocols. Lead full life cycle development of Client-Server Internet applications using UNIX, C, C++, and the standard UNIX protocol TCP/IP. Design test protocols. Research design issues in web and Internet technologies and design optimum solutions. Meet with clients to resolve ongoing development issues. 9:00 am - 5:00 pm. M-F. 40 hrs/wk. $70,000/year. Require M.S. or equiv. degree in Computer Science, Engineering Maths or equivalent and 2 years experience in the job offered or 2 years experience as a Sr. Software Engineer, Process System Engineer or equivalent. Experience must comprise design and development of software using Unix, C or C++, and TCP/IP. Relocation possible. Job in Keene, NH. Send two copies of resume/letter of application to: JO No. 2000-348, P.O. Box 989, Concord, NH 03302-0989

Programmer Analyst. Perform system analysis, design, development, support, testing, and implementation of business and commercial application software using Oracle 7.x, Forms 4.5, Reports 2.5 under Ultrix, Windows NT, and Oracle Workgroup environments. Perform fine tuning of network database applications to decrease response time and minimize memory usage by code optimization and efficient algorithms. Prepare technical documentation, user manuals and instructional manuals as required by end-user. Provide on-site maintenance support to customer on various custom software packages including de-bugging, modifications, fine tuning, and code optimization. Multiple openings: 40 hrs./wk., 9:00 a.m.–5:00 p.m. $75,000/yr. B.Sc. in comp. science or engin. or equiv. + 2 yrs. exp. in job offered or as systems analyst or programmer analyst. M.S. + 1 yr. exp. accepted in lieu of B.Sc. + 2 yrs. exp. Apply to: Sharper Logics, Inc., Ref. NWA12, 615 Beaver Ruin Rd., Ste. A, Lilburn, GA 30047.

GROUP INFO MGT MANAGER (SAP)

POLAROID CORPORATION, a global leader in instant imaging research, technology and products, has a need to fill a Group Information Management Manager (SAP) position. This Boston-area position will be responsible for leading the design and implementation of global business processes and SAP integrated software.

• Requirements include a Bachelor's degree in C/S, Math, EE, or similar field, and eight (8) years experience involving the design, development, implementation and support of enterprise-wide, multi-functional information technology systems.

• Salary ranges from $87,768 - $107,040, with two weeks paid vacation, medical insurance, and other industry competitive benefits.

Respond with resume only to: Ms. Natalie Perry, Manager HR, Global Resource Mgt., Polaroid Corp., 920 Winter St. (R1-1), Waltham, MA 02451. Fax (781) 386-9540. Email: perryn@polaroid.com
Polaroid is an EOE-M/F/D/V/SO.

Oracle Applications Consultant. Responsible for designing, developing and implementing software programs using Oracle financial applications. Responsible for defining the hardware environment and all system utilities that will needed. Determine the size of the Oracle database, and the number of disk drives needed to house the data, the optimal configuration for the database and the number for concurrent users to determine the amount of hardware memory required. Responsible for maintenance and housekeeping utilities and database administration during the implementation phase of specific projects. Requires: Bachelor's degree (or foreign degree equivalent) in Computer Science, Information Science or related field, 2 yrs. exp. in the job offered or as a Software Developer, MIS Systems Officer or Oracle Database Administrator. Exp., which may have been obtained concurrently, must include 2 yrs. exp. using Oracle. EOE. 40 hrs/wk. Salary: $65,000/yr. Send resume (no calls) to: Diane Tuccito, AnswerThink Consulting Group, 817 W. Peachtree St., Ste. 800, Atlanta, GA 30308.

WE DO A BETTER JOB AT HELPING YOU GET ONE.

itcareers.com

BOSE CORPORATION, an innovative leader in consumer electronics and acoustics, has an immediate need to fill a range of SAP, EDI and Sales Systems Support positions in the Boston area.

The following positions all require a Bachelor's degree (or equivalent) in Computer Science, MIS, Business Administration, or similarly relevant field, and 2-6 years relevant experience to include the requirements described below.

PROGRAMMER – ANALYST POSITIONS

• SAP Basis Administrators (with SAP experience, involving both Oracle and HP-UX and protocols, in a production environment.)

• EDI – Sales Systems Support Programmer / Analyst (with EDI mapping and HP-UX scripting experience, in a production environment.)

Starting salaries range from $47,100 to $82,600 per year, together with two weeks annual paid vacation, medical and life insurances, and other industry-competitive benefits.

Please mail or fax your resume to: Mr. Donald Baptiste (IMSP), Bose Corporation, Dept. 5-D-1, The Mountain, Framingham, MA 01701. Fax: (508) 766-7499. Email:don_baptiste@bose.com. Visit: www.bose.com

An equal opportunity employer

SENIOR STAFF SCIENTIST (Atlanta, GA) to research, design and implement advanced optimization and forecasting algorithms for company's analytical and predictive applications, including cost based and multi-echelon replenishment, product planning and allocation, demand forecasting, and promotion analysis using technologies such as linear and nonlinear optimization, mixed integer programming, time series analysis, stepwise regression, neural network and genetic algorithms. Design, implement, test and release company's client-server applications using tools such as object-oriented C++ and Java, Ilog optimization suite, Oracle and multi-dimensional databases. Serve as a mentor to junior staff scientists. Require: Master's degree in Applied Mathematics, Computer Science/Engineering, Statistics, or a closely related field. Must have a demonstrated ability to perform stated duties gained through previous work experience/academic coursework. Graduate-level coursework must have included at least one course each in linear and nonlinear optimization, mathematical statistics and numerical analysis. Salary: $75,000 per year. Apply on-line at www.retek.com/apply. Be sure to include "AC1082700" as the source code.

SYSTEMS ANALYST/ PROGRAMMER (Chicago, IL). Plans, devs, tests & docs comp progs. Ecite user reqts to determine feasibity, costs, time reqrd, compatibty w/current sys & comp capabits. Consults w/user to identfy current oprtng procdrs & clarify prog objtvs. Frmltes plans using strctrd analysis & design. Prepare flowcharts & diagrams. Design comp trml screen displays. Convert proj specs for coding into comp language. Run & tests progs. Detect syntax & logic errors. Modify codes if necsry. Analyze, rev & alter prog to increase oprtng efficiency. Doc prog devmt, logic, coding & corctions. Write manual for users, solve oprtng probs. Locate sources of robs to correct errors. Dev progs that meet user reqrmnts using knowledge of UNIX, CC++, WINDOWS NT, & VISUAL BASIC. Bach of Science in Comp Science or any other field, 40 hrs/wk, $42,000.00 yr w/1 yr exp. Send 2 copies of resume & cover letter to Leila Jackson, Illinois Dept of Employment Security, 401 So State St, 7 No, Chicago, IL 60605. Ref #V-IL-21742-J. Applicants must sho proof of legal authority to work in the U.S.

Information Technology

Perot Systems Corporation and it's subsidiary companies, Solutions Consulting LLC, Perot Systems Healthcare Services Corporation, Time 0 LLC, Perot Systems Communication Services, Inc is a worldwide provider of information technology services and business solutions. Through its integrated service offering, Perot Systems delivers end-to-end solutions that address all aspects of strategy, systems and infrastructure, enabling clients to accelerate growth, streamline operations, and create new levels of customer value. The company has more than 7,500 Associates located in the United States, Europe, and Asia. Additional information on Perot Systems is available at http://www.perotsystems.com.

We are looking for individuals with an entrepreneurial spirit to join our growing team of professionals. Team Leader-Applications Development, Systems Technicians, Applications Development, Systems Integration, Systems Analyst, Systems Engineers, Software Engineers,SAP Consultants, Principal Engineers, Financial Analysis, Data Center Operations, Database Administrators, Business Consultants, Business Analyst and Systems Design & Delivery.

Positions vary but can be located in Texas, California, Virginia, Michigan, Florida, Massachusetts, Illinois, Minnesota, Colorado, New York, Connecticut, Iowa, Kentucky, North Carolina, Pennsylvania, Arizona, District of Columbia, Georgia, Kansas, Louisiana, Maine, Maryland, Missouri, Nevada, New Jersey, New Mexico, Ohio, Oklahoma, Rhode Island, South Carolina, Tennessee, Utah, Washington, West Virginia or Wisconsin.

email resumes to: recruiting@ps.net
attn: 1LPUBITB

perotsystems™

MAGNA INFOTECH, a fast growing consulting company is looking for Programmer/Analysts, Software Consultants and Software Engineers with experience in one or more of the following:

ERP
Baan Implementation, Tools, Admin

AS/400
RPG/400, COBOL/400, CL, BPCS, JD Edwards, Synon

REAL TIME
Microprocessor, RTOS Programming

UNIX
C, C++, Shell, AIX, HP-UX Solaris Admin

WINDOWS
VC++, VB, PB, MFC, OLE/COM

INTERNET
Java, Javascript, CGI, Perl, WAP, Admin, Active X

DATABASE
Oracle, Informix, Sybase, DB2 Admin Developer 2000, Designer 2000

Multiple positions exist at various sites across the US.

If you are interested please mail your resume clearly mentioning the reference number CW0300 to: **Attention Recruiting Dept., Job Ref. CW1000, Magna Infotech Ltd. 1 Padanaram Rd., Suite 208, Danbury, CT 06811-4833.**

RCM Technologies

The Source of Smart Solutions

RCM Technologies is seeking junior and senior systems analysts/programmers for consulting positions at client sites throughout the U.S. Minimum Bachelor's with experience or Masters degree required. Send or fax resume to **RCM Technologies, Inc., Code: WHL, 26913 Northwestern Hwy., Ste. 450, Southfield, MI. 48034. Fax: 248-350-0200.** RCM Technologies is an equal opportunity employer.

PROGRAMMER-ANALYST

Plans, develops, tests and documents computer programs, applying knowledge of programming techniques and computer systems. Evaluates user request for new or modified programs to determine feasibility, cost and time required, compatibility with current system, and computer capabilities. Consults with user to identify current operating procedures and clarify project objectives and specifications. Converts project specifications into sequence of detailed instructions for coding into language processable by computer, applying knowledge of computer programming techniques and computer languages. Analyzes, reviews and alters program to increase operating efficiency or adapt to new requirements. Eight (8) years Grade School; Four (4) years High School; Four (4) years College; Bachelor's Degree in Computer Science; six (6) months experience as Programmer-Analyst. Salary: $33.75 per hour; Overtime pay: N/A; 40 hours per week; 8 am - 5 pm, M-F. Overtime N/A. All resumes must include the Applicant's Social Security Number. Apply to nearest NC Job Service office or submit resume to: Job Service, 742-F East Chatham Street, Cary, NC 27511. Reference: Job Order #NC5703512: DOT Code 030.162-014.

INFORMATION TECHNOLOGY OPPORTUNITIES

The Gillette Company

The Gillette Company is the world leader in more than a dozen consumer product categories. Global World Class operations are increasingly dependent on Information Technology. Exciting opportunities exist in global business process integration initiatives. We are currently seeking the following highly qualified professionals to join the Gillette IT team in the Boston area.

The following positions (unless otherwise noted) all require a Bachelor's degree (or equivalent) in Computer Science, MIS, Business Admin., or similarly relevant field, and 3-5 years relevant experience to include the requirements described below.

- Senior Staff Programmer Analyst with 5 years business systems programming experience, 3 years of which involved SAP ABAP development, with design and QA expertise, and SQL/relational databases. [Job Code #: IMSP-DL-1CP]
- (SAP) Staff Basis Administrator with 3 years IT experience defining requirements and maintaining SAP Basis infrastructure, with SAP remote printing, HP-UX, and EMC hardware/software.[Job Code #: IMSP-DL-100008CP]
- Senior Telecommunications Analyst with Associate's degree, 3 years experience in design and implementation of multi-carrier global networks using Cisco hardware and software. [Job Code #: IMSP-DR]

Starting salaries range from $53,700 to $96,400 per year, together with paid vacation, medical, dental, life and disability insurances, and other industry-competitive benefits.

Please mail / email resume to: The Gillette Company, Prudential Tower Building, Human Resources (Mailstop JM-IMSP), Boston, MA 02199. Email: JM_IMSP@Gillette.Com.

The Gillette Company is an equal employment opportunity employer

---

IT Integration Engineer II: Provides engineering/systems support in the development, testing, monitoring and deployment of systems, networks, applications and/or programs in the IT/Network area. Utilizes experience in database development and management with a background in systems training and software support. Utilizes experience with the implementation and management of structured workgroups and development methodologies. Provides creative solutions to technical problems, develops new or improved techniques as required by the customer and application. Evaluates, builds, tests, corrects, documents and implements planned products and processes. Designs solutions and improvements while managing customer expectations and meeting customer requirements. Plans, organizes and monitors day-to-day work activities and change management processes on sub-projects or process components, as required. Negotiates with internal and/or external contacts. Assists less experience personnel. Shares information and technical knowledge with co-workers. Keeps abreast of technologies related to business objectives and industry specific trends. 40 hrs/wk, 9am to 5pm; $50,016/yr. Must have a Bachelor's degree in Computer Science or a related field which may include engineering, math, physics, or business. Applicant must have the following experience through education or work, if experience is through work, applicant must have six months experience in these areas: advance database development and management with a background in systems training and software support and experience with the implementation and management of structured workgroups and development methodologies. Must have proof of legal authority to work permanently in the U.S. Send resume and letter in dupl. to: Labor Exchange Office, 19 Staniford St., 1st Fl. Boston, MA 02114., Attn: George Avila Case # 20002489. An employer paid Ad. No calls.

SOFTWARE SUPPORT FOR STRATEGY CONSULTING

Decision Architects, a Monitor Group Company, providing customized software solutions in support of strategy consulting, has an immediate need to fill a range of software, database and IT positions in the Boston area.

The following positions all require a Bachelor's degree (or equivalent) in Computer Science, MIS, Business Administration, or similarly relevant field, and 2-6 years' relevant experience to include the requirements described below.

PROGRAMMER - ANALYST and DATA BASE DESIGN ANALYST POSITIONS

- **Application Development Analyst (Business Systems)** with experience building software-based business analysis models, and a functional understanding of accounting.
- **Data Base Design / Application Consultant** with experience in software development, data base admin/ design, performance-tuning, Oracle Lite and Express, and a functional understanding of financial accounting.

Starting salaries range from $58,500 to $77,500 per year, together with two weeks' paid vacation, medical, dental, life and disability insurances, and other industry-competitive benefits.

Please mail or fax resume to: Ms. Ashley Kiersten, Recruitment Manager, Decision Architects, 2 Canal Park, Cambridge, MA 02141. Fax: (617) 761-3677 Email: Hire_Me@decisionarc.com

Visit: www.decisionarc.com

Decision Architects, a Monitor Group Company, is an equal opportunity employer

---

SOFTWARE & DATABASE POSITIONS

BROOKS AUTOMATION, INC., a global, public company engaged in the design, development, manufacture and sale of material handling robotic and other hardware and software systems to technology manufacturers, seeks to fill a number of Software Engineer and Database positions at various levels of responsibility at our location in Chelmsford, MA.

All positions require a Bachelor's degree (or equivalent) (some require a Master's degree), together with at least 1 to 7+ years relevant industry experience:

Principal Engineer (Client-Server Mfg. Systems)
- (3-Tiered Client-Server Arch.; OO Design / Dev.; Semiconductor Mfg. Execution Systems)

Senior Software Engineer (Infrastructure)
- (Multibyte Character Set Support; Unicode; Messaging Systems)

Oracle Database Administrator (Data modeling)
- (CASE tools and AIX-UNIX)

Starting salaries from $50,200 - $107,900, commensurate with the position's specific responsibilities, together with contributory medical, full dental and disability insurances, and other industry competitive benefits.

Please mail or fax your resume, indicating Reference Code "IMSP", to: Brooks Automation, Inc., ATTN: Ms. Susan Sacca, Human Resources, 15 Elizabeth Drive, Chelmsford, MA 01824; Fax: 978/262-2508. Visit our website at www.brooks.com.

Brooks Automation is An Equal Opportunity Employer.

CHIEF PROGRAMMER / Object-Oriented Investment Software

Computer Aided Decisions, Inc., a small Boston-area company engaged in the design and development of sophisticated software-based investment systems, seeks to fill a **Chief Programmer/Object-Oriented Investment Software** position. This position will be responsible for managing in-house and contract software teams developing highly sophisticated, large-scale applications for portfolio management, trading, and investment research.

Requirements include a Master's degree in C/S or other quantitative /engineeng field, and three (3) years experience involving object-oriented software projects, inclusive of large-scale development for investment applications. A Bachelor's degree or academic equivalent, and five (5) years progressive experience, will substitute for Master's and 3 years of such experience. Starting salary from $90,000 - $110,000, three weeks paid vacation, medical insurance, and other industry competitive benefits.

Respond with resume only to: Ms. Pam Tapia, Computer Aided Decisions, Inc., 21 Custom House Street, Boston, MA 02110.

Fax: (617) 428-3606. An EOE.

Visit: www.cadinvest.com

Software Engineer: Designs and develops high quality software for diagnostic imaging equipment to support imaging, networking or serviceability for global manufacturer of medical diagnostic equipment. Identifies system requirements and develops high level designs using DFSS (Design For Six Sigma) methodologies. Implements and tests software products to ensure platform compatibility and system reliability. Coordinates activities of groups within the organization located in Europe, Asia and/or the United States in connection with the development of software. Utilizes high level languages (C/C++, VC++, Java), scripting (Unix-Shell/Perl), and web technologies (HTML, CGI, web server, web browser, servlets). Engages in Object Oriented Programming, Software Modeling and Design Patterns. Drives software solutions to improve performance and/or reduce cost. Provides modality support for existing products, troubleshoots and upgrades features. Engages in configuration management using ClearCase and defect racking using DDTS. Required is a Master of Science degree in Computer Science or Computer Engineering and six (6) months of experience in the position being offered OR six (6) months of related experience as an Engineer or Graduate Research Assistant. As part of the required experience in the position being offered or in the related occupation, the applicant must have had experience with high level programming languages, including C, C++, and Java; had experience with scripting languages (Perl), had programming experience with NT specific technologies, including Win32 programming, MFC, and COM, and had experience with Object Oriented Programming, Software Modeling with UML, and Design Patterns. Monday through Friday; 8:00 am to 5:00 pm; 40 hours per week; $63,523.20 annually. Qualified applicants may submit two (2) copies of resume and cover letter to: Mike Brooks, File #C101714: DWE-ALC: PO Box 7972; Madison, Wisconsin 53707-7972. Reference File #C101714.

Senior Software Engineer whose responsibilities will include: requirements analysis, domain analysis, design, development and maintenance of software system for telecommunications products including data network components and network management architectures, using Object Oriented (OO) Development process, Object Oriented analysis, Object Oriented design and development tools (including use cases, Booch, Objectory, OMT) and Object Oriented languages. Define and document Object Oriented testing process and perform Object Oriented (OO) testing using Object Oriented testing methodology. Utilize knowledge of OO, intelligent agent, distributed system, relational and flat file databases, switches and telecommunication to define and enhance the system. This includes exploring and evaluating new technologies, design and develop software architecture and systems on Unix platform. Utilize the principles of data base systems; software engineering, theory of computation; compiler construction; computer architecture. Must have a Master of Science Degree in Computer Science or Electrical Engineering. Four years experience required as a Senior Software Engineer or four years as a Software Designer and/or Analyst and/or any combination thereof. Coursework must have included: data base systems; software engineering, theory of computation; compiler construction; and computer architecture. Experience must have been gained in the telecommunications industry and must have included: Object Oriented Software development using use cases, Booch, Objectory, and Object Oriented (OO) testing methodology. Applicants must have had experience in system development on a Unix platform, including relational database and flat file database development. 40 hours per week, 8:00 a.m. to 5:00 p.m., $70,000 per year. North suburban Chicago location. Must have proof of legal authority to work permanently in the U.S. Send 2 copies of both resume and cover letter to Illinois Department of Employment Security, 401 South State Street - 7 North, Chicago, IL 60605, Attention: Joanne Breaux. Reference # V-IL 24232-N. An Employer Paid Ad. No Calls.

Business Analysts: Positions available in our New York, New York City, Chicago, San Jose, San Francisco and Nashville area offices. Will work with exceptional teams of computer and business professionals participating in full life-cycle development of distributed, object-oriented applications. Will apply OO analysis and design methodologies and object modeling techniques to design OO applications. Will be responsible for working with users to define system requirements. Will translate those requirements into clear and precise specifications for the developers to implements. Will design screens, write use cases, design and perform system testing. Requirements: Bachelor's degree in Business, Finance, Computer Information Systems or related field, or foreign equivalent. If interested, please email your resume and cover letter to jobs@thoughtworks.com.

Business Analysts: Positions available in our New York, New York City, Chicago, San Jose, San Francisco and Nashville area offices. Will work as team leaders with exceptional teams of computer and business professionals participating in full life-cycle development of distributed, object-oriented applications. Will apply OO analysis and design methodologies and object modeling techniques to design OO applications. Will be responsible for working with users to define system requirements. Will translate those requirements into clear and precise specifications for the developers to implements. Will design screens, write use cases, design and perform system testing. Requirements: Master of Science degree in Computer Science, Computer Engineering or Electrical Engineering, or related field, or foreign equivalent. Bachelor's degree in Computer Science, Computer Engineering or Electrical Engineering or related field or foreign equivalent, plus five years of experience, which must include experience in programming with an object-oriented programming language; If interested, please email your resume and cover letter to jobs@thoughtworks.com.

Applications/System Architects: Positions available in our New York, New York City, Chicago, San Jose, San Francisco and Nashville area offices. Will work with exceptional teams of computer and business professionals participating in full life-cycle development of distributed, object-oriented applications. Will design, develop and implement enterprise wide, distributed applications in various OO, client/server, n-tier environments against various relational databases. Will utilize OO languages, including Forte and Java and relational databases such as Informix, Oracle, Sybase, MS SQL Server, and DB2. Will lead development teams. Requirements: Master of Science degree in Computer Science, Computer Engineering or Electrical Engineering, or related field, or foreign equivalent. Bachelor's degree in Computer Science, Computer Engineering or Electrical Engineering or related field or foreign equivalent, plus five years of experience, which must include experience in programming with an object-oriented programming language; If interested, please email your resume and cover letter to jobs@thoughtworks.com.

Manager, Personnel (Software Engineering) Plans and carries out policies relating to all phases of personnel activity: Recruits, interviews, and selects employees locally and internationally to fill vacant positions for software development firm. Plans and conducts new employee orientation to foster positive attitude toward company goals. Keeps record of insurance coverage, pension plan, and personnel transactions, such as hires, promotions, transfers, and terminations. Conducts wage survey within labor market to determine competitive wage rate. Prepares budget of personnel operations. Writes separation notices for employees separating with cause and conducts exit interviews to determine reasons behind separations. Prepares reports and recommends procedures to reduce absenteeism and turnover. Contracts with outside suppliers to provide employee services, transportation, or relocation service. May prepare budget of personnel operations, using computer terminal. Must have knowledge of Software development & technologies. Must have experience in recruiting, interviews and select employees to fill vacant positions. Must be available to work outside business hours $73,000/yr.40 hr/wk. 9 a.m - 5p.m. Must have 2yrs.exp.and M.S. or equiv in Bus Admin., rel field/equiv.Send 2 resumes: Case#20002453, Labor Exchange Office,19 Staniford St,1st.fl.Boston, MA 02114.

"Telecommunications company is looking to hire an Electrical Engineer at a wage of $72,820.80 per year. The job duties for this position are as follows: Analyze, design, and develop DC/DC and AC/DC circuit packs for custom product applications, including power factor correction, soft switching techniques, synchronous rectifying, forward and flyback power topologies, Analog Work Bench and Mathcad. Using EMI analysis and noise reduction techniques to resolve layout and noise issues in power electronics circuits. Negotiating requirements, designing, characterizing and laying out circuits to meet high performance, high yield and cost targets. Working with engineers and technicians to introduce products into production. The minimum education is a Master's Degree in either Computer Science, Engineering (any type), or Information Systems. The minimum experience is six months in the job offered or six months in the related occupations of Consultant, Analyst and/or Research Assistant. Other special requirements for the position are six months experience that included design, simulation & prototyping of high frequency (100K-2M) power electronic circuits, using power factor correction, soft switching, synchronous rectifying, forward & flyback topologies, Analog Work Bench and Mathcad, layout, EMI analysis, and control theory. Apply at the Texas Workforce Commission, Dallas, Texas, or send resume to the Texas Workforce Commission, 1117 Trinity, Room 424T, Austin, Texas 78701, J.O. #TX0944368. Ad paid by an equal opportunity employer."

CW001016C1W-5

Diversity Not a New Issue for These Companies

Over the past 15 years, business discussions concerning diversity have moved from "it's the right thing to do" to "it's a business imperative." The change has been the recognition that being able to attract the top talent - regardless of gender, color, education, background or age - is a priority for any business.

Kellogg Company

Battle Creek, MI

"Diversity at Kellogg is a matter of practicing what we preach," says Andre Goodlett, Kellogg associate director of staffing. "We have diversity in our leadership, and the demographics at every level reflect a diversity of color, gender and background."

While the face of Kellogg is a diverse one, the head of the Diversity department reports to the Office of the Chairman, assuring that valuing differences remains an important part of business operation. "Diversity isn't a once a year thing here," adds Goodlett. "We have the programs and events, but more important is that we understand that a talented, diverse workforce is the lifeblood of our company."

This talented, diverse workforce carries through to the IT organization for the company best known for Tony the Tiger™ and those zany guys Snap, Crackle and Pop™. "We're in an exciting time for IT," Goodlett says. "Our e-commerce program is multi-faceted, including a brand loyalty program known as EAT and EARN™ and the more traditional e-commerce aspects of operations management. Our web site has always been a leader, but we are pumping it up on a continuous basis."

IT positions at Kellogg include database management, analysis, network architecture design and management, system integration, ERP systems and project management. "Because IT is a driving force behind our business, there is a lot of opportunity for hands-on experience," says Goodlett. "We have complex projects across multiple technologies. If you're interested in making a contribution and being able to go as far as your talents allow, this is the place."

KPMG Consulting, LLC

Dallas, TX

Sean Huurman, national director of recruiting for KPMG Consulting, believes technological innovation and the war for talent have created the business imperative of diversity. "It's not just a socially conscious thing to do, it's a strong business decision," he says.

"As the technologies have continued to develop and vary, we're finding new strongholds of technology expertise, which also adds to the diversity of the organization," Huurman says. "We also are seeing an increase in effort at U.S. schools to recruit and graduate diverse candidates."

Globalization also has created diversity needs. "For instance, as we work with Latin American communication companies, we know they won't settle for consultants who don't understand the culture, the community and the directions in terms of what they are looking for," Huurman says. "English may be the global language, but it is very much a second language for many of our clients. It's up to us to be able to communicate, not up to our clients."

KPMG Consulting expects to fill 3,500 IT positions in 2000. The company is recruiting for all types of e-commerce, m-commerce and basic technologies - Java, C++, Portal and Cobol, as well as skills required for billing and call centers. The company has locations in 825 cities worldwide. "Technical skills are important," says Huurman, "but more important is understanding how technology plays out in the work day for the individuals who will use the technologies.

"We don't organize around individuals or differences," says Huurman. "We organize around our work. Any job candidate, regardless of race or gender, is looking to use the skills they know, to learn new skills and new technologies. And we offer that to every candidate who walks through the door. Our job is to build relationships across the firm that support our employees. The number one selling point for us is that we consider ourselves a $2 billion startup. We are pre-IPO, we play in an exciting e-business space. The key difference is that we have the knowledge and backing of a stable, revenue generating organization."

Pitney Bowes Mailing Systems Division

Stanford, CT

For over seven decades, Pitney Bowes has been a corporation focused on ensuring that their employee population reflects their customer base and their communities. The result is a company whose history is steeped in valuing diversity, where diversity is a part of the business planning process and where diversity is valued because of its ability to create new ideas and innovations.

"We're a company that takes pride in the number of inventions and patents we hold," explains Linda Stephenson, director of staffing. "We have lab units within the company, places where employees can go to invent new products. It's a fantastic play space for the technologically talented, where they can go and create."

Marie Radcliff, manager of diversity and compliance, says this innovative approach is possible because the company has paid so much attention to diversity. "We were 'sending' the message long before most companies were 'getting' the message about diversity," she claims, pointing to the company's pro-active outreach efforts, which predate the Civil Rights Legislation. The result is that Pitney Bowes has made it a function of business, continuously conducting research to assure that the company's job openings get in front of the faces of diverse people. Today that means everything from working to identify new and emerging web sites to ensuring all audiences have equal access to Pitney Bowes Mailing Systems' opportunities. Pitney Bowes Mailing Systems will be participating in the Women of Color Technology Conference in Orlando.

Currently, Pitney Bowes Mailing Systems is reinventing its IT organization. The division has identified emerging technological needs, the skills needed to support them, and the jobs required. The jobs range from an IT leader for the human resources group to web developers, e-commerce experts, network developers, storage and database managers and analysts, platform integrators and client/server leaders. "The projects being designed now vary from enterprise messaging, network design, supply chain and e-commerce to new services that we will provide to small and large business customers," says Stephenson.

"You can be an individual contributor or a member of one of our project crews," she adds. "Pitney Bowes is a great place for people who want to invent and create, who are looking for strong work/life balance and support for continuous learning. We look inside first for our leaders, and that requires that we continuously look at skills that will be needed and provide the opportunity to gain those skills."

IT careers

For more job opportunities, turn to the pages of ITcareers.

- **If you'd like to take part in an upcoming ITcareers feature, contact Janis Crowley, 650.312.0607 or janis_crowley@itcareers.net.**
- **Produced by Carole R. Hedden**
- **Designed by Aldebaran Graphic Solutions**

How to Contact Computerworld

TELEPHONE/FAX

Main phone number (508) 879-0700
All editors unless otherwise noted below
Main fax number (508) 875-8931
24-hour news tip line (508) 820-8555

E-MAIL

Our Web address is **www.computerworld.com.** All staff members can be reached via e-mail using the form: **firstname_lastname@computerworld.com.**

All IDG News Service correspondents can be reached using the form: **firstname_lastname@idg.com.**

LETTERS TO THE EDITOR

Letters to the editor are welcome and should be sent to: **letters@computerworld.com.** *Include your address and telephone number.*

MAIL ADDRESS

PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701

SUBSCRIPTIONS/BACK ISSUES

Subscription rates: U.S., $58/year; Canada, $110/year; Central and South America, $250/year; all others, $295/year

Phone (800) 552-4431
E-mail circulation@computerworld.com
Back Issues (508) 820-8167

REPRINTS/PERMISSIONS

Phone Ray Trynovich (717) 399-1900, ext. 124
E-mail rtry@rmsreprints.com

CONTACTING CW EDITORS

We invite readers to call or write with their comments and ideas. It is best to submit ideas to one of the department editors and the appropriate beat reporter.

Editor in Chief Maryfran Johnson (508) 820-8179
Editorial Director, Print/Online Patricia Keefe (508) 820-8183

DEPARTMENT EDITORS

News Editor Anne McCrory (508) 820-8205
Features Editor Kevin Fogarty (508) 820-8246
Assistant News Editor Don Tennant (508) 620-7714
Assistant Business Editor Melissa Solomon (508) 620-7754
Assistant Technology Editor Tommy Peterson (508) 620-7729
Washington Bureau Chief Mitch Betts (202) 347-6718
West Coast Bureau Chief Pimm Fox (650) 524-7116
West Coast Editor Mark Hall (503) 391-1158

REPORTERS

Mobile computing/wireless Bob Brewin (301) 277-8069
Internetworking, telecom/wireless, defense and aerospace James Cope (219) 273-5369
Application development, Java, automotive Lee Copeland (773) 394-0402
Careers, labor issues, outsourcing, application service providers, health care Julekha Dash (804) 295-9512
General assignment, e-mail, groupware Jennifer DiSabatino (508) 820-8122
Security, encryption, viruses Ann Harrison (650) 524-7117
Business-to-business e-commerce Julia King (610) 532-7599
Network, systems management, food, retail and restaurant Sami Lais (301) 270-1427
General assignment, travel Michael Meehan (508) 620-7704
General assignment, storage Kathleen Ohlson (508) 820-8215
Microsoft operating systems and BackOffice, retailers Carol Sliwa (508) 628-4731
Enterprise resource planning, customer relationship management and supply-chain software; Novell Marc L. Songini (508) 820-8182
General assignment, Intel servers, transportation/carriers Linda Rosencrance (508) 628-4734
State/federal government, antitrust, legal issues, politics Patrick Thibodeau (202) 333-2448
IT management, financial services Maria Trombly (413) 323-0842
B2C e-commerce and technologies, databases, data mining, Web infrastructure Dan Verton (703) 321-2277
Large systems/high-end Web server technology, security, heavy manufacturing Jaikumar Vijayan (508) 820-8220
General assignment, Linux and Unix operating systems Todd Weiss (717) 560-5255

OPINIONS

Senior Week Columnist Frank Hayes (503) 252-0100
Columns Editor Rick Saia (508) 820-8118

FEATURE EDITORS

Special Projects Editor Ellen Fanning (508) 820-8204
Business Feature Editor Thomas Hoffman (845) 988-9630
Reviews Russell Kay (508) 820-8175
Technology Evaluations Editor Robert L. Mitchell (508) 820-8177
IT Management Rick Saia (508) 820-8118
IT Careers David B. Weldon (508) 820-8166

FEATURE WRITERS

Gary H. Anthes (202) 347-0134
Matt Hamblen (508) 820-8567
Kathleen Melymuka (508) 628-4931
Kim S. Nash (773) 275-4133
Matthew Schwartz (508) 820-8285
Deborah Radcliff (707) 829-5823

RESEARCH

Mari Keefe, **research manager;** Lisa Sydney, **online researcher;** Allison Wright, **research associate;** Jennifer McBride, **research intern**

COPY DESK

Jamie Eckle, **managing editor/production** (508) 820-8202; Jean Consilvio, **assistant managing editor/production**; Michele Lee, Bob Rawson, **senior copy editors**; Jacqueline Day, Eugene Demaitre, Linda Frank, Mike Parent, **copy editors**

GRAPHIC DESIGN

Stephanie Faucher, **design director**, (508) 820-8235; Mitchell J. Hayes, **art director/news**; John R. Brillon, April O'Connor, David Waugh, **associate art directors**; Julie D'Errico, **graphic designer**; Joy Park, **editorial graphics coordinator**; Rich Tennant, John Klossner, **cartoonists**

ADMINISTRATIVE SUPPORT

Linda Gorgone, **office manager** (ext. 8176); Connie Brown (ext. 8178); Lorraine Witzell (ext. 8139); Gussie Wilson (650) 524-7035, **editorial assistants**

COMPUTERWORLD ONLINE

Tom Monahan, **director, online and design** (508) 820-8218; Sharon Machlis, **managing editor/online** (508) 820-8231; Craig Stedman, **online news editor** (508) 820-8120; Marian Prokop, **online news editor** (508) 620-7717; Brian Sullivan, **communities page editor** (508) 620-7780; Peter Smith, **Web development manager**; David Ramel, **online production coordinator and e-mail newsletter editor**; William Rigby, **online services manager**

CONTRIBUTING COLUMNISTS

Allan E. Alter, Joe Auer, Jim Champy, John Gantz, Dan Gillmor, Peter G. W. Keen, Bill Laberis, David Moschella, Fran Quittel, Paul A. Strassmann, Don Tapscott, Ed Yourdon

CONTRIBUTING WRITERS

Leslie Goff, Amy Helen Johnson

COMPANIES IN THIS ISSUE

Page number refers to page on which story begins. Company names can also be searched at **www.computerworld.com**

2600 ENTERPRISES INC 52
2ROAM INC 70
3COM CORP 32
ISTAKE INC 52
A.G. EDWARDS & SONS INC 20
ABERDEEN GROUP INC 12,70
ABOVENET COMMUNICATIONS INC 86
ADVANCED COMMUNICATIONS NEWHOUSE 1
AIRBORNE FREIGHT CORP 72
AMERICA ONLINE INC 12
AMR RESEARCH INC 1
ANSWERTHINK INC 90
APPLE COMPUTER INC 28
ARMSTRONG WORLD INDUSTRIES INC 44
ARTHUR ANDERSEN LLP 90
AT&T CORP 1
ATTUNITY INC 82,84
AUTHORA INC 64
AUTOPACIFIC INC 7
AVANTGO INC 70,88
AVENTIS 12
BABY GAP 88
BANCWEST CORP 1
BAYERSCHE MOTOREN WERKE AG 70
BLUE CROSS/BLUE SHIELD OF TENNESSEE 14
BLUE PUMPKIN SOFTWARE INC 44
BLUEFLY INC 6
BMW MANUFACTURING CO 70
BRANCH, CABELL & CO 28
BRISTOL-MYERS SQUIBB CO 58
BURLINGTON NORTHERN SANTA FE CORP 56
CABLE & WIRELESS PLC 72
CALDERA SYSTEMS INC 26
CATERPILLAR INC 1
CDNOW ONLINE INC 88
CEPHREN INC 80
CHEVRON CORP 20
CISCO SYSTEMS INC 24,90,106
CLARE, CHAPMAN 1
STOREY & CASTRO LLP 62
CLAREON CORP 24
COMPAQ COMPUTER CORP 1,14,30,76
COMPUTER SCIENCES CORP 46
COMPUTER SECURITY PRODUCTS INC 74
COMPUWARE CORP 14,28
CONECTIVA CORP 26
COREL CORP 26
COVISINT 20
COX COMMUNICATIONS INC 1
CSK TECHNOLOGY INC 90
CULT OF THE DEAD COW COMMUNICATIONS 52
CURIOUS NETWORKS INC 70
CUTTER CONSORTIUM 50
D. H. BROWN ASSOCIATES INC 14
DAIMLERCHRYSLER AG 20
DATAHAVEN PROJECT INC 52
DOCNET HOLDING 20
DELL COMPUTER CORP 6,7,14,28
DELPHI AUTOMOTIVE SYSTEMS CORP 7
DEUTSCHE BANK 1
DIGEX INC 80
DIGITAL EQUIPMENT CORP 32
DRAPER FISHER JURVETSON 88
DU PONT CO 1
EASTMAN CHEMICAL CO 1
ECERTAIN 14
EDISON SCHOOLS INC 58,60
ELECTRONIC DATA SYSTEMS CORP 46
EMC CORP 28
EMERY WORLDWIDE 12
ENTERPRISE APPLICATIONS CONSULTING 1
ENTERPRISE DEVELOPMENT CORP 90
ENTRUST TECHNOLOGIES INC 24
EONE GLOBAL LP 24
ERNST & YOUNG INTERNATIONAL 52
EVERYPATH INC 70,86
EVINYARD INC 80
FEDERAL COMMUNICATIONS COMMISSION 6,8,12
FEDEX CORP 20
FIRST DATA CORP 24
FIRST HAWAIIAN BANK 1
FISCHBACH & MOORE ELECTRIC LLC 80
FLEETBOSTON FINANCIAL CORP 8
FMC CORP 1
FORD MOTOR CO 7,20
FORRESTER RESEARCH INC 7,10,44
FREEMARKETS INC 44
FUJITSU LTD 12
FUJITSU PC CORP 76
GALILEO INTERNATIONAL INC 64
GARTNER GROUP INC 7,72,80
GARTNER/DATAQUEST 72
GATEWAY INC 28
GENERAL & COLOGNE LIFE RE OF AMERICA INC 58,60
GENERAL ATLANTIC PARTNERS LLC 24
GENERAL DYNAMICS CORP 46
GENERAL MOTORS CORP 7,20
GIGA INFORMATION GROUP INC 6,28,80,88
GLOBAL COMPANIES LLC 82
GOMEZ ADVISORS INC 6,7,10,24
HARRIS CORP 90
HEWLETT-PACKARD CO 12,14,16
HITACHI LTD 12,28
HOLYOKE MUTUAL INSURANCE CO 8
HURWITZ GROUP INC 14,28
I2 TECHNOLOGIES INC 1,7
IBM 12,14,28,32,46,60,76,78,82,84,90
IFORMATION GROUP 24
IMPROVENET INC 44
INSIGHTEXPRESS LLC 64
INTEL CORP 6,16,24,28,80,96
INTERNATIONAL COMPUTER NEGOTIATIONS INC 64
INTERNATIONAL DATA CORP 26,48,98
INTERNATIONAL ORACLE USERS GROUP 28
INTERNET SECURITY SYSTEMS INC 74
ISG INTERNATIONAL SOFTWARE GROUP LTD 82
IT FACTORY INC 28
ITCENTRIX INC 14
JERBOA INC 54
JETBLUE AIRWAYS CORP 44
KMART CORP 1
KRAFT FOODS INC 56
L. L. BEAN INC 44
LAWSON SOFTWARE 82
LEIPZIGER & BRESKIN LLP 62
LINCOLN LIFE AND ANNUITY COMPANY OF NEW YORK 58,60
LOPEZ FOODS INC 1
LOTUS DEVELOPMENT CORP 12
LUCENT TECHNOLOGIES INC 28
LYCOS INC 48
MANHATTAN SCHOOL FOR CHILDREN 58,60
MARATHON OIL CO 12
MAYFIELD FUND 7
MCCONNELL INTERNATIONAL LLC 24
MERRILL LYNCH & CO 33
META GROUP INC 1,70,72
METAGON TECHNOLOGIES LLC 82,84
MICROSOFT CORP 1,6,12,14,28,74,82,84,96
MOBILEARIA INC 7
MOBILITY SERVICES INTERNATIONAL INC 90
MOTOROLA INC 24
MPHASE TECHNOLOGIES INC 70
MRI TAMPA CORPORATE OFFICES 90
MTV NETWORKS 12
MYSAMON INC 88
NASDAQ STOCK MARKET INC 12,90
NATIONAL LOAN INVESTORS LP 1
NBC INC 8
NEC CORP 28,76
NETIQ CORP 12
NETMORF INC 88
NETWORK APPLIANCE INC 28
NETWORK ASSOCIATES INC 74
NORTEL NETWORKS CORP 72
NORWALK COMMUNITY COLLEGE 58
OBJECT MANAGEMENT GROUP INC 20
OCEANIC CABLE 1
OIL FIELD SERVICES PORTAL 20
OPEN SPIRIT CORP 20
OPENSPIRIT ALLIANCE 20
ORACLE CORP 28,82,84
OSHKOSH B'GOSH INC 60
PAINTANDCOATINGS.COM 1
PALM INC 7,70,106
PANDESIC LLC 80
PARTECH INTERNATIONAL INC 88
PBS 18
PGP SECURITY 74
PHILIP MORRIS COS 56
PLURAL INC 6
POTOMAC ELECTRIC POWER CO 1
POWERWAY INC 20
PQ CORP 1
PRICEWATERHOUSECOOPERS 16,90
PROMETRICS LTD 20
PROXICOM INC 44
RCA CORP 20
RED HAT INC 26
ROAD RUNNER LLC 1
ROYAL DUTCH/SHELL GROUP 20
SANYO ELECTRIC CO 6
SAP AG 1
SBC COMMUNICATIONS INC 1
SCHLUMBERGER LTD 20
SECURITIES CORPORATION OF IOWA 28
SECURITYFOCUS.COM 8
SEND.COM 50
SHOPCHEM.COM 10
SHOP.ORG 10
SILICON GRAPHICS INC 12,28
SILICON VALLEY BANK 90
SKY COURIER 72
SMARTWATER EUROPE LTD 74
SOFTBANK E-COMMERCE CORP 12
SOROS PRIVATE EQUITY PARTNERS LLC 6
SOUTHWEST AIRLINES CO 44
SOUTHWESTERN BELL TELEPHONE CO 1
SPRINT CORP 86
STAMPS.COM INC 64
STORAGE TECHNOLOGY CORP 28
SUN MICROSYSTEMS INC 14
SUSE LINUX AG 26
SYBASE INC 82,84
TACTICAL STRATEGY GROUP INC 36
TANDEM COMPUTERS INC 82
TARGET VISION INC 70
TELECHOICE INC 70
TEXAS INSTRUMENTS INC 20
THE BOEING CO 44
THE BOSTON CONSULTING GROUP 24
THE COBALT GROUP INC 20
THE CONFERENCE BOARD 60
THE GOLDMAN SACHS GROUP INC 24,44,64
THE INSIGHT RESEARCH CORP 1
THE MOTLEY FOOL INC 80
THE MTVI GROUP INC 12
THE POINTS OF LIGHT FOUNDATION 60
THE YANKEE GROUP 10,20,70
TICKETMASTER ONLINE-CITYSEARCH INC 88
TIME WARNER INC 1,12
TOSHIBA AMERICA INFORMATION SYSTEMS INC 76
TOWERGROUP 6
TOYOTA MOTOR SALES USA 7
TRADEOUT INC 64
TURBOLINUX INC 6,12,26
UBS WARBURG LLC 44
UNISYS CORP 6,82
UNITED AIR LINES INC 64,106
UNITED PARCEL SERVICE OF AMERICA INC 20
UNITED TECHNOLOGIES CORP 106
UNITED VAN LINES 106
UNIX INTERNATIONAL 20,26
USINTERNETWORKING INC 80
UUNET TECHNOLOGIES INC 86
VA LINUX SYSTEMS INC 26
VARIAN ASSOCIATES INC 20
VENTUREPARK INCUBATOR AG 20
VERIZON COMMUNICATIONS 1
VIAFONE.COM INC 88
VISA INTERNATIONAL INC 6,33
VIVIDENCE CORP 10
WEB.DE 1
WEBMETHODS 1
WESTERN UNION HOLDINGS INC 24
WILSON, OKAMOTO & ASSOCIATES INC 1
WIT SOUNDVIEW GROUP INC 28
WORLD TRADE ORGANIZATION 54
X.COM CORP 24
YAHOO INC 48
ZEROKNOWLEDGE SYSTEMS USA INC 52

ADVERTISERS INDEX

Applied Computer Research 46
ASPECT 51
AT&T 73
Attunity 42
Authentica 75
Bitpipe 48
Brocade 79
Canon 65
Computer Associates Decision Base 9
Computer Associates Uncenter TNG 22-23
Digex 61
Dell 48/49*
Dell 850 2-3
Dell Corporate 38-39
E-Business Forum 17
Entex 47
Firebrands 40*
Foundry Networks 71
Hewlett-Packard 25, 27, 29
IBM 54/55
ICOM Informatics 89*
Intel 21
InterSystems Corp. 68
Liebert Powersure 85
Marysville Technologies 91*
Microsoft Exchange Server 30-31
Microsoft Platform 37
Microstrategy 77
Network Engines 63
Network ICE 26
Nortel Networks 59
PACE/BUTLER Corp. 46
PricewaterhouseCoopers 45
RHI Consulting 72
SAP 66-67
SAS 15, 34-35, 70
Seattle Times Company 92*
Siemens C4
Storage Industry Buyer's Guide & Directory 32/33
Storage Networking World 49
Syncsort 4
Thingamajob.com 53
Tonic Software 18-19
Unisys 10, 11
Verizon 40*
Visual Network 13
WebSolutionsWorld.com C3
Wireless Knowledge 87
Xerox 40/41

*Regional Select Edition

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Continued from page 1

Corporate Cable

Over the past five months, First Hawaiian has connected 600 desktops to the high-speed (10M bit/sec.) Oceanic service. It expects to have 1,000 desktops hooked into the cable system by the end of the year.

Takahashi said Oceanic provides him with faster and more reliable service at a lower cost than similar offerings from the local phone company, a subsidiary of New York-based Verizon Communications. Takahashi said that when his company priced comparable high-speed services from Verizon 18 months ago, the phone company's rates were "almost double" those of Oceanic.

Verizon failed to return calls for comment by press time.

Homegrown Demand

Oceanic spent $75 million eight years ago to upgrade its cable network to support two-way, high-speed data service for its 300,000 residential subscribers. It initially had no intention of serving the corporate market because it didn't anticipate that there would be any demand, said Kiman Wong, the company's general manager of Internet services.

But "once people had [Road Runner] at home, they wanted it at work," Wong said. The company now services 1,300 commercial accounts. To beef up its commercial business, Oceanic developed a suite of corporate access products, offers Web hosting services and plans to extend its commercial reach by wiring the urban core of Honolulu, Wong added.

Cox Business Services, a division of Cox Communications Inc. in Atlanta, is another cable company that is pushing toward providing high-speed Internet access for businesses. Users said they're pleased to find a cheaper alternative to the local phone company.

Jim English, chief financial officer at Lopez Foods Inc. in Oklahoma City, said Cox's "aggressive" pricing for its high-speed service was a key factor in choosing Cox over Southwestern Bell Telephone Co., a subsidiary of SBC Communications Inc. in San Antonio.

Lopez, which produces hamburgers, sausage and Canadian bacon for McDonald's restaurants, has 75 users hooked up to the Cox service and plans to use it in its new executive office building. The high-speed connection "means people are not sitting here twiddling their thumbs waiting for their e-mail," English said.

Cox, which operates as a competitive local exchange carrier in Oklahoma City, offered Lopez a package of services that included high-speed data and phone service priced 41% below Southwestern Bell, which subsequently made a counteroffer. But Cox still charges 12.5% less than the deal offered by Southwestern Bell, English said.

Ken Tysell, director of DSL business/retail at SBC, acknowledged growing competition with cable TV companies for the corporate market. "They're munching at our business, but we're also munching away at theirs," Tysell said. "Clearly, competition is increasing in broadband ... but we believe we have as good or better offerings as theirs."

David Barnes, an information systems manager at National Loan Investors LP, a mortgage servicing company in Oklahoma City, said connectivity, not price, prompted him to choose Cox over Southwestern Bell. "We're at the end of their copper plant, and they could not offer us the service we needed," he explained.

National Loan is in the process of upgrading its service to a dedicated T1 line and a hardware virtual private network. It's sticking with Cox, Barnes said.

Barnes said he uses his residential Road Runner service to manage batch processing on office servers at night. "It's much more convenient from home," he said. "And I can do everything I need to do, [including running] diagnostics."

The business of providing high-speed cable services to corporate America is in such a stage of infancy that The Insight Research Corp. in Parsippany, N.J., was "surprised" to discover the inroads it has started to make, said Christopher Whitely, project manager for a recent study on Digital Subscriber Line vs. cable.

"We started the study with the preconceived notion that cable provided only residential service ... but we quickly got an indication that there was also a business market," Whitely said. "It's still in its early stages but should grow over the next five to 10 years."

By 2005, Insight predicts, the U.S. will have an installed base of 32 million cable modems, generating $11.5 billion per year in revenue. The research firm didn't break out business vs. residential data.

Road Runner LLC in Herndon, Va., owned by AT&T Corp., Time Warner, Microsoft Corp., Compaq Computer Corp. and Advanced Communications-Newhouse, foresees growth in package plans for businesses that want high-speed access for teleworkers.

Mark Mercer, vice president of commercial services at Road Runner, said he intends to pursue as much corporate business as he can land. But, he added, he believes that growth will come even more quickly from package deals for remote workers or telecommuters in the 44 Road Runner markets nationwide.

"We're going after national accounts for telecommuters," Mercer said, "with a great deal on a bulk price for corporate accounts."

Cable's Coming

Representative corporate cable data pricing:

OCEANIC CABLE

Road Runner Pro
Supports up to 10 users through a hub at $79.95 per month

Road Runner Prox-X
Adds proxy server to basic service, with each PC connected to the server costing $9.95 per month above the basic charge of $79.95.
- Doesn't include a fixed IP address

Road Runner LAN
Unlimited number of PCs can operate behind proxy server at a cost of $350 per month
- Includes fixed IP address and DNS

COX 'AT WORK' PROFESSIONAL

- 26 to 50 users, one IP, $895 per month
- For more than 50 workers, $100 additional per month per block of 25 users
- $50 for each additional IP
- Installation charge of $995
- Rates lower on three- and five-year plans

Continued from page 1

Recruiting

often means hiring people right out of college.

At Washington-based Potomac Electric Power Co., the focus also has been on hiring IT rookies such as new college and technology-school graduates. "We do want to retain our people," said Ken Cohn, the utility's CIO. "On the other hand, we know that we're not going to in all cases. And so what we're trying to do is constantly backfill with rookies, young talent ... that we can train quickly."

Mendes, Cohn and other IT executives discussed labor issues as part of a panel at the 2000 Greater Washington Technology Showcase conference and technical expo. Members of the panel said the key to hiring and retaining workers is being flexible with employee needs and staying in tune with their career goals and plans.

If companies provide their employees with viable career paths, educational opportunities and the ability to work with new technologies and "give them a life that is semi-sane," retention rates tend to be high, Mendes said.

But Mendes said IT managers should also think about hiring more minorities and disabled people. Older IT workers with skills no longer in demand also have potential, he added: "If they had the ability, from an intellectual standpoint, to learn the legacy systems, why can't they have the ability to learn the new systems?"

The need to be creative in employment matters is being driven, in part, by the continuing IT labor shortage, Mendes and other panelists noted. For example, Meta Group Inc. in Stamford, Conn., estimates that there will be 850,000 vacant IT jobs in the U.S. by year's end.

Fairfax County, Va., has succeeded in filling all but 13 of its 367 IT positions by emphasizing its flexibility on issues like job sharing and by making few extra demands on a workers' time, said CIO David Molchany. Employees rarely have to work on weekends, except on special projects. Even then, "it's nothing like the grind of the private sector," he said.

The federal government, which is facing a pressing need for IT help because of growing numbers of retirement-eligible workers, is attractive to people who aren't primarily motivated by salary, said Alan Balutis, director of the advanced technology program at the U.S. Department of Commerce. "Not everyone wants to work 80 hours a week with a chance at being a millionaire at some point in their life," he said.

But one thing the federal government can't do is move quickly to extend an offer to a potential employee, Balutis said. Getting a federal job frequently can take 60 to 90 days. "I couldn't compete [with the private sector] even if they gave me monies to match the salaries," he said.

Be Flexible

Filling vacant IT slots takes creativity and flexibility, say CIOs:

Invest in training: Hire talented rookies and older workers

Offer workplace perks: Job-sharing, telecommuting and flexible hours, for example

It's not just a job: Create a career path for IT workers

Periodical postage paid at Framingham, Mass., and other mailing offices. Posted under Canadian International Publication agreement #0385697. CANADIAN POSTMASTER: Please return undeliverable copy to PO Box 1632, Windsor, ON N9A 7C9. Computerworld (ISSN 0010-4841) is published weekly except a single combined issue for the last week in December and the first week in January by Computerworld, Inc., 500 Old Connecticut Path, Box 9171, Framingham, Mass. 01701-9171. Copyright 2000 by Computerworld Inc. All rights reserved. Computerworld can be purchased on microfilm and microfiche through University Microfilms Inc., 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Computerworld is indexed. Back issues, if available, may be purchased from the circulation department. Photocopy rights: permission to photocopy for internal or personal use is granted by Computerworld Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress St., Salem, Mass. 01970. Reprints (minimum 100 copies) and permission to reprint may be purchased from Ray Trynovich, Computerworld Reprints, c/o Reprint Management Services, Greenfield Corporate Center, 1811 Olde Homestead Lane, Lancaster, Pa. 17601, (717) 399-1900, ext. 124. Fax (717) 399-8900. Web site: www.rmsreprints.com. E-mail: rtry@rmsreprints.com. Requests for missing issues will be honored only if received within 60 days of issue date. Subscription rates: $5 per copy U.S. - $58 per year; Canada - $110 per year; Central & So. America, $250 per year; Europe - $295 per year; all other countries - $295 per year. Subscriptions call toll free (800) 552-4431. POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Box 2044, Marion, Ohio 43305.

ABC ABP

FRANK HAYES/FRANKLY SPEAKING

The name game

TAKE FIVE MINUTES and try something: Make a list of the 10 Web addresses you'd be most likely to guess for your company's Web site if you didn't know its actual domain name. (If you can't think of 10, throw in a few likely misspellings to pad out the list.) Now test them with a Web browser. Any surprises? There really shouldn't be, but there probably are.

Find a few other people in your IT shop and ask them to make the same kind of list. Then test their lists. A few new guesses, a few more surprises, right?

Now ask some friends or family members to make the same sort of list. Try to get a wider range of ages and personal backgrounds into the mix this time. Still more guesses, still more surprises — but you're starting to see patterns, aren't you?

This is how customers actually use the Web: They guess. A lot. Once they've found a Web site they want, they *may* bookmark it. If the first few guesses don't pan out, they may use a search engine. But there's a lot of guessing going on out there.

And it's a good idea to keep track of what they're likely to be guessing — and to find out where those guesses will take them.

Say you work for a U.S. airline, for example. United-air.com is the address of a Taiwanese air-compressor company. American.com leads to Cisco Systems. Deltaair.com and Continentalairlines.com take a customer to the same travel agency, and continentalair.com to a different travel agency. Us-air.com, Transworldair.com, Alaska-airlines.com and Southwestair.com are owned by the airlines you'd expect but aren't connected to the appropriate Web sites.

And that doesn't include domain names owned by companies that have names similar to the airlines but no Web sites. Or domain names owned by cybersquatters. Or any sites a customer would hit by mistyping the name (Untied.com, for example, is a site for complaints about United Air Lines).

And this is just a snapshot from October 2000. In a month or a year, more chances for confusion could crop up.

Confusing customers is something you want to avoid. Your marketing department may be spending buckets of bucks promoting your site. You're spending even more to make sure the site is attractive and works the way it's supposed to.

But that's all money down a rat hole if the customers never get there.

And while it's technically Marketing's job to build your company's brand and Legal's job to protect it, don't kid yourself — when it comes to domain names, IT is supposed to have the experts.

This is how customers actually use the Web: They guess. A lot.

So what can you do to stem that confusion? That depends on what the name game turns up. Maybe you'll find some confusingly similar domain names that haven't already been registered. Registering those available domain names, and pointing them to your home page, is a cheap way around an easy-to-botch Web address.

Maybe you'll learn you've already got some of those domain names — and no one remembered to redirect them to your home page.

Maybe you'll discover cybersquatters you didn't know about. Kick their names over to Legal to decide whether any action is necessary.

And most likely you'll stumble across some legitimate businesses whose domain names are a lot like yours. That kind of confusion is nothing new — long before the Web there were United Air Lines, United Van Lines and United Technologies. But at least you'll know why misdirected e-mail and Web surfing may have gone astray.

So play the name game. Play it often. Keep testing the results. Because on the Web, as long as your company's customers are playing guessing games, you should be too. ◗

Hayes, Computerworld's senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

SHARK TANK

PLUG IT IN Lone IT pilot fish at a manufacturing plant must add two PCs where there's only one network connection. "Simple solution – I just use a minihub to connect both computers," says the fish. But early one Saturday, fish gets a call: The two users can't log on. PCs are on? Check. Cables and power cord connected? Yes, the users swear. Fish sighs, climbs out of bed, drives to the plant, hikes to the remote section of the plant – and plugs the power cord back into the hub.

TURN IT ON After 10 minutes on the phone troubleshooting a monitor problem ("Monitor is broken and user has been unable to get on his computer for days, he says"), LAN admin dispatches support pilot fish to the user's office. After a moment's inspection, the fish pushes the power switch on the user's monitor to turn it on, and then reboots the PC – which had been in power-save mode.

TURN IT OVER A user needs help resynchronizing the stylus for his PalmPilot. "Look on the back of the PalmPilot, and you'll see a tiny hole with the word *reset* beside it," fish says. Not there, says user. Fish trudges over and discovers that the user has flipped open the handheld's leather protector, which now covers the back instead of the front of the PalmPilot. Fish closes the flap. "Oh, there it is!" says the user.

PULL THE PLUG Is our uninterruptible power supply (UPS) system adequate? new IT boss asks. Sure, pilot fish answers: "Each server is on its own UPS with 30 minutes' battery time. I live close and am paged when the machines go down." "What about this one?" the boss asks, pointing to the e-mail server. "Is it ready for testing?" Fish nods – and the boss dramatically grabs the power cord and pulls it straight out of the back of the server. The machine instantly stops dead. "I thought you said these things were on UPSes," boss complains. Result: 11 a.m. to 3 p.m. with no e-mail.

Make the connection: **sharky@computerworld.com**. You score a sharp Shark shirt if your item sees print – or if it shows up in the daily feed on the Web at *computerworld.com/sharky*.

The 5th Wave

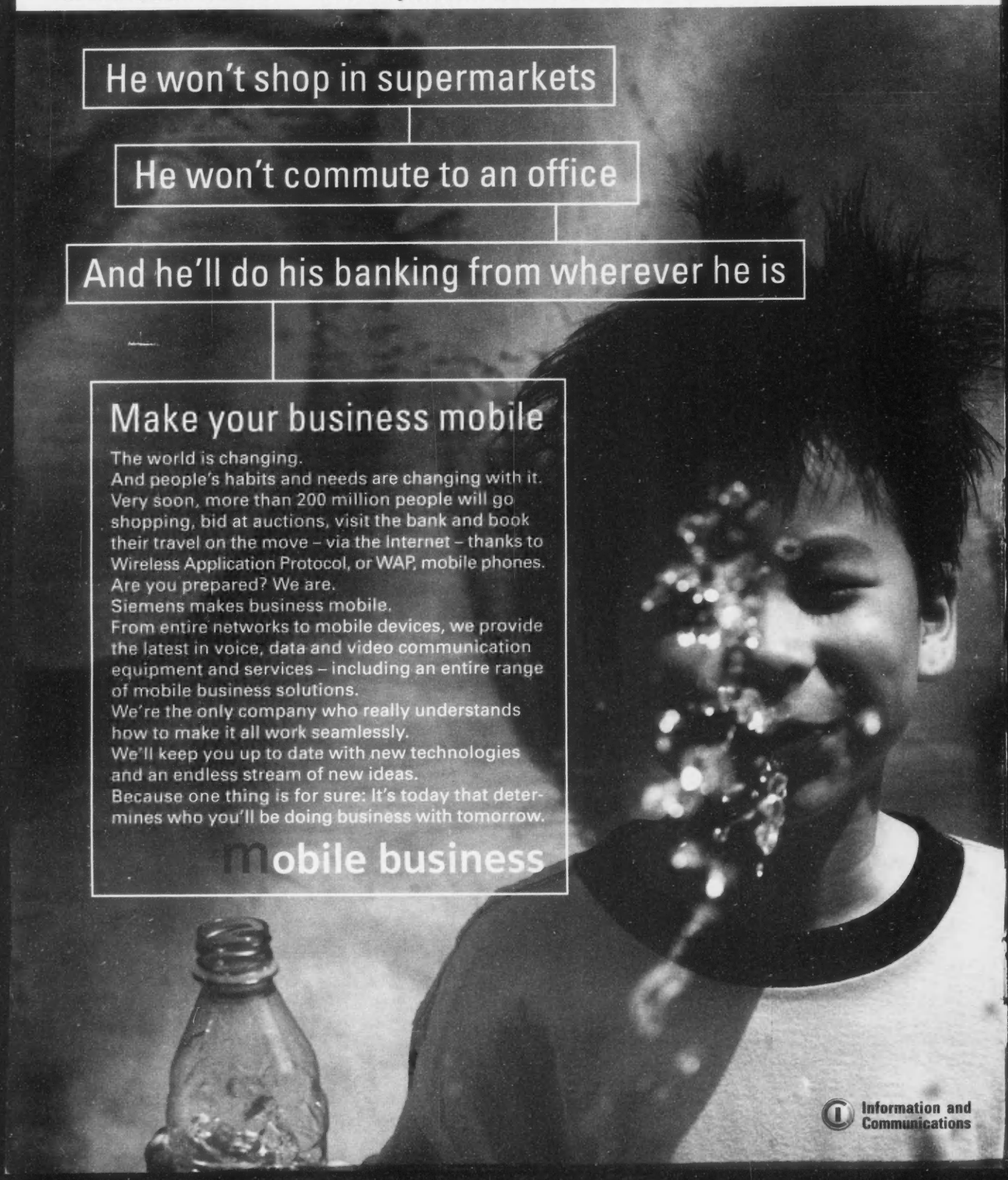
"Come on in. I left my new voice recognition system on so you could try it."

Find out about the best strategies and solutions to build your business.

WebSolutionsWorld.com

Visit ***www.websolutionsworld.com*** to be prepared for anything and everything. You never know what lurks out in the ether.

IDG.net ALADDIN COMPAQ intel Microsoft protegrity SurfControl WEBRIDGE

SIEMENS

We're making business mobile. See how your business can profit at: **www.siemensmobilebiz.com**